Makame Savannah Reduced Emissions From Deforestation And Forest Degradation





Document Prepared By **Carbon Tanzania[1], and TerraCarbon[2]**

Project Title	Makame Savannah REDD
Version	1.0
Date of Issue	29 August 2017
Project Location	Makame Wildlife Management Area Kiteto District, Arusha Region, Tanzania
Project Proponent(s)	CT Limited, t/a Carbon Tanzania, Marc Baker Email: marc@carbontanzania.com; Phone: +255 (0) 784 448761
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Validation Body	
Project Lifetime	27 April 2016 - 26 April 2046; 30-year lifetime
GHG Accounting Period	27 April 2016 - 26 April 2046
History of CCB Status	Not applicable
Gold Level Criteria	Community: Masai community owned land and resources through wildlife management area (WMA) designation. Biodiversity: Protection of key habitat for 13 IUCN Red List species, 2 endemic birds and providing ecosystem connectivity for migratory mammal populations Climate: Regional level climate analysis and community-based identification of climate threats and adaptation. Development of resource planning and adaptation in response to identified climate change impacts.
Expected Verification Schedule	

Acronyms

WMA	Wildlife Management Area
REDD	Reducing Emissions from Deforestation and Forest Degradation
ICDP	Integrated Conservation Development Projects
PES	Payments for Ecosystem Services
CBNRM	Community Based Natural Resource Management
MWMA	Makame Wildlife Management Area
RMP	Resource Management Plan
TSC	Timed Species Count
NTRI	Northern Tanzania Rangelands Initiative
EENT	Endangered Ecosystems of Northern Tanzania
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit
CCB	Climate Community and Biodiversity
AA	Authorized Association
UCRT	Ujamaa Community Resource Team
AAC	Authorized Association Consortium
NGO	Non-governmental Organization
USAID	The United States Agency for International Development
SRF	Systematic Reconnaissance Flight
GHG	Greenhouse Gases

Table of Contents

1 Summary of Project Benefits 4
1.1 Unique Project Benefits 4
1.2 Standardized Benefit Metrics 5
2 General 8
2.1 Project Goals, Design and Long-Term Viability 8
2.2 Without-project Land Use Scenario and Additionality 31
2.3 Stakeholder Engagement 32
2.4 Management Capacity 37
2.5 Legal Status and Property Rights 41
3 Climate 45
3.1 Application of Methodology 45
3.2 Quantification of GHG Emission Reductions and Removals 52
3.3 Monitoring 82
3.4 Optional Criterion: Climate Change Adaptation Benefits 109
4 Community 111
4.1 Without-Project Community Scenario 111
4.2 Net Positive Community Impacts 120
4.3 Other Stakeholder Impacts 124
4.4 Community Impact Monitoring 125
4.5 Optional Criterion: Exceptional Community Benefits 129
5 Biodiversity 137
5.1 Without-Project Biodiversity Scenario 137
5.2 Net Positive Biodiversity Impacts 145
5.3 Offsite Biodiversity Impacts 148
5.4 Biodiversity Impact Monitoring 148
5.5 Optional Criterion: Exceptional Biodiversity Benefits 152
Appendices 155
Appendix 1: Stakeholder Identification Table 155
Appendix 2: Project Activities and Theory of Change Table 156
Appendix 3: Additional Information 159

1 SUMMARY OF PROJECT BENEFITS

1.1 Unique Project Benefits

Outcome or Impact Estimated by the End of Project Lifetime	Section Reference
Strengthened land-rights – the five WMA village communities will enjoy increased capacity to enforce their existing land-use plans that are designed to protect habitat which supports the traditional pastoralists' livelihoods	2.5
Improved and secure access to grazing areas for domestic animals – the project will strengthen the status of areas reserved specifically for seasonal grazing of pastoralist herds that form the value-basis of the Masai communities' traditional lifestyle.	4.2
Access to increased revenue from wildlife-based tourism – the project will improve the communities' ability to attract wildlife-based tourism, both consumptive and non-consumptive as the areas that support wildlife populations are protected better through the project activities.	4.2
Ecosystem connectivity for the southern part of the Tarangire-Manyara Ecosystem is maintained supporting pastoralist livelihoods, migratory corridors and habitat for threatened species	5.2

1.2 Standardized Benefit Metrics

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
GHG emission reductions or removals	Net estimated emission removals in the project area, measured against the without-project scenario	n/a	-
	Net estimated emission reductions in the project area, measured against the without-project scenario	1,364,411 tCO2e	3.2
Forest[1] cover	For REDD[2] projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario	46,194Ha	3.2
	For ARR[3] projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	n/a	-
Improved land management	Number of hectares of existing production forest land in which IFM[4] practices are expected to occur as a result of project activities, measured against the without-project scenario	n/a	-
	Number of hectares of non-forest land in which improved land management practices are expected to occur as a result of project activities.	n/a	-
Training	Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities	150	4.4
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	60	4.4

[1] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)
[2] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)
[3] Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)
[4] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood and fuelwood (*VCS Program Definitions*)

Employment	Total number of people expected to be employed in project activities,[5] expressed as number of full-time employees[6]	60	4.4
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	20	4.4
Livelihoods	Total number of people expected to have improved livelihoods[7] or income generated as a result of project activities	>7500	4.4
	Number of women expected to have improved livelihoods or income generated as a result of project activities	>1500	4.4
Health	Total number of people for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	>7000	4.4
	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	>2500	4.4
Education	Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	>1000	4.4
	Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	>500	4.4
Water	Total number of people who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	n/a	-
	Number of women who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	n/a	-
Well-being	Total number of community members whose well-being[8] is expected to improve as a result of project activities	>9000	4.4

[5] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.
[6] Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from the UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])
[7] Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. *The Sustainable Livelihood Approach to Poverty Reduction*. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.
[8] Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Livelihoods, Health, Education and Water), and may also include other benefits such as strengthened legal rights to resources, increased food security, conservation of access to areas of cultural significance, etc.

	Number of women whose well-being is expected to improve as a result of project activities	>4000	4.4
Biodiversity conservation	Expected change in the number of hectares managed significantly better by the project for biodiversity conservation,[9] measured against the without-project scenario	>350,000Ha	2.1.1
	Expected number of globally Critically Endangered or Endangered species[10] benefiting from reduced threats as a result of project activities,[11] measured against the without-project scenario	5	5.2

[9] Managed for biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation, e.g. enhancing the status of endangered species

[10] Per IUCN's Red List of Threatened Species

[11] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 GENERAL

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Summary Description of the Project (G1.2)

Carbon Tanzania seeks to combine elements of conventional integrated conservation and development projects (ICDP) with a "payments for ecosystem services" (PES) approach when designing and implementing the Makame Savannah REDD project. REDD has at times been conceived narrowly as simply a system of conditional performance-based payments (PES)[12]. Projects developed by Carbon Tanzania are similarly premised on performance-based payments, but we have gone further in developing an approach to project implementation that recognizes the part that can be played by tried and tested interventions. These include participatory land use mapping, boundary determination, development of land use plans, clarification of tenure, income generating activities, employment and community development.

Following the principles of community-based natural resource management (CBNRM), the key underlying assumption of the Wildlife Management Area (WMA) concept is that providing local communities with economic benefits and involving them in the management[13] of wildlife resources found in their areas will promote both the long-term health of wildlife, protect habitat and create rural economic development.

Communities will thus have a vested interest in the conservation of natural resources because they benefit directly from sustainable management. WMAs were formally adopted as an approach for involving communities in wildlife management. WMAs can provide local residents with benefits through associated enterprises that sustainably utilize either wildlife or other natural resources in the WMA.

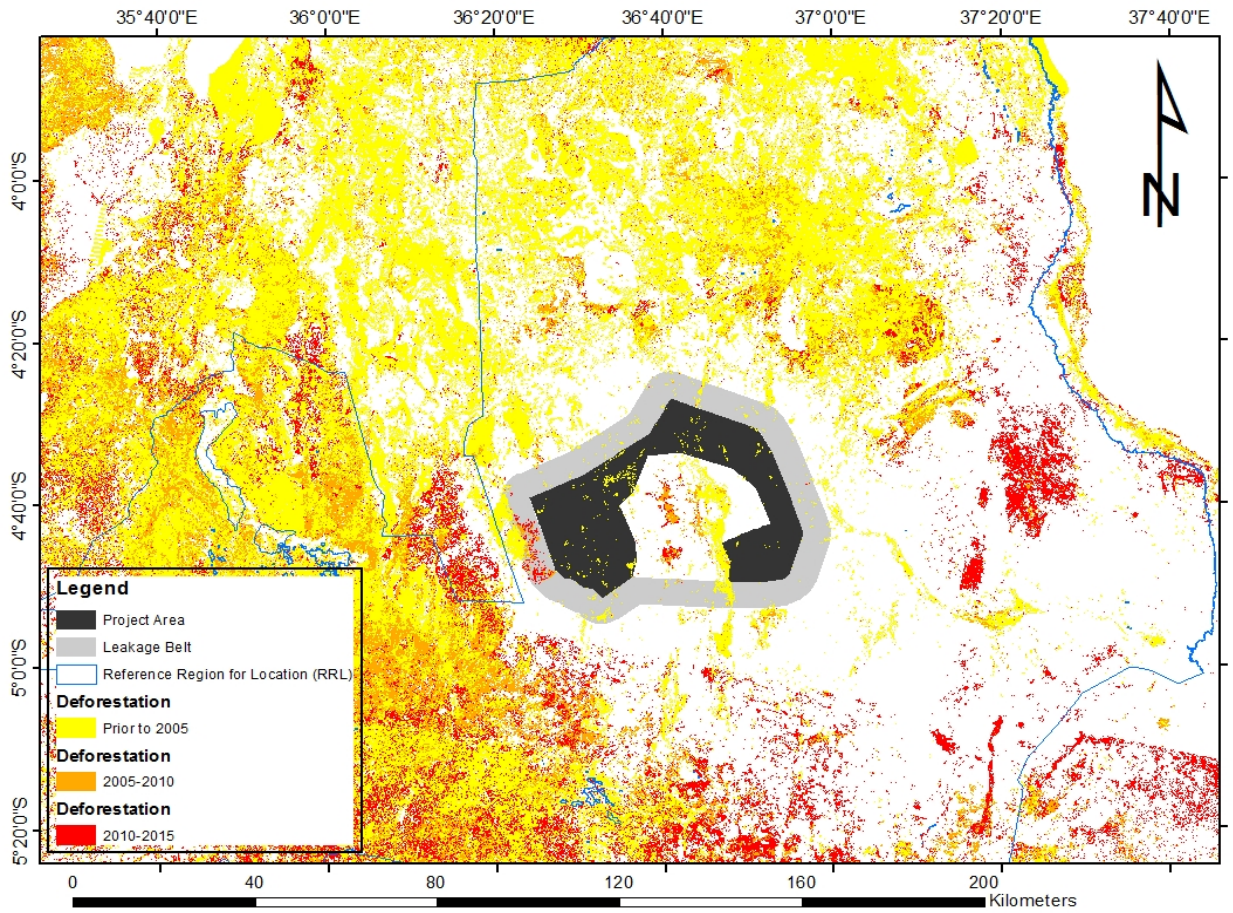
The Makame Savannah REDD project will protect the Makame WMA from land grabbing and encroachment, and the conversion of land from forest to agriculture, thereby stopping deforestation and preventing GHG emissions generated through tree harvesting and clearing land for agriculture. In doing so the Masai communities living within the WMA will receive improved land tenue, grazing rights and significant income. This REDD project protects the southern extension of the Tarangire-Manyara ecosystem and in doing so protects significant biodiversity and megafauna, both resident and migratory.

Location of the project

The project is located in the northern part of the Makame Wildlife Management Area (WMA), Kiteto District, northern Tanzania. This project area covers 104,065 hectares of Acacia-Commiphora scrub and Woodland, and is located 120 km due south of Arusha, Tanzania. The whole WMA is a 364,300 hectare area buffered by 102,700 hectares of community land also managed by the same communities. As depicted in Figure 2.1, this area is under increasing threat from deforestation.

[12] Sills *et al.* (2009), The evolving landscape of REDD projects.
[13] In this context, management means the communities have the rights to earn income from wildlife though photographic and hunting tourism. The communities do have the right to breed, cull or pen wildlife in fenced enclosures.

Figure 2.1.1. Deforestation in and around the project area.



An explanation of how the project is expected to generate GHG emission reductions or removals

One of the primary project activities is to assist in development, submission and implementation of Makame Wildlife Management Area's Resource Management Zone Plan, henceforth referred to as the Resource Management Plan (RMP)(Appendix 5)[14]. Implementation of the WMA RMP will result in: the conservation of natural resources in the area, strengthening of governance in Makame WMA member villages, securing of land rights for local communities, and improving the livelihoods of local communities. Each of these actions will help to reduce the increasing pressures on the local forest resources - pressures that are apparent in Figure 2.1 above.

Scenario existing prior to the implementation of the project

The without-project scenario involves lack of implementation of the WMA Resource Management Plan (WMA RMP). Land tenure, WMA boundaries and land-use planning would continue to be poorly-defined in the baseline without-project scenario. As a result, project area forest lands continue to be at risk of intrusion by outsiders and conversion to agriculture.

[14] The Makame WMA Council. 2017. Makame Wildlife Management Area Resource Management Zone Plan, 2017-2022. Kiteto, Manyara,

Estimate of GHG emission reductions and removals

Table 2.2. in section 2.1.17 shows the project is estimated to generate 136,411 tCO2e annually for the first 10 years of the project. The cumulative net GHG emission reduction over this same time period is estimated to be 1,364,112 tCO2e.

Project's climate, community and biodiversity objectives

The project's targets have been broadly defined based on what the community cares most about and what its members felt would be critical to achieving the goal of the project. These targets were identified during a series of community workshops and include aspects related to natural resources as well as to important social, cultural, economic or religious aspects of the community. Proper management of these assets will result in the sustainable use of the resources that are most critical for long-term community and environmental health in the Makame WMA.

Major climate, community and biodiversity objectives include:

1. Protect and conserve natural resources in Makame WMA;
2. Promote sustainable tourism in designated Makame WMA zones;
3. Improve livelihoods of Makame WMA communities;
4. Secure land rights for Makame WMA communities;
5. Protect and maintain the culture and traditions of Makame WMA community members;
6. Strengthen governance in Makame WMA member villages; and
7. Improve access to and quality of healthcare in Makame WMA.

2.1.2 Project Scale

The Makame Savannah REDD Project is not considered to be a "Large Project", as the estimated annual emission reductions for the first baseline period is 136,411 tCO_2e per year, less than the 300,000 tons of CO_2 per year which indicates a "Large Project".

Project Scale	
Project	**X**
Large project	**N/A**

2.1.3 Project Proponent (G1.1).

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Email	**jo@carbontanzania.com**

2.1.4 Other Entities Involved in the Project

Organization name	Makame Wildlife Management Area Authorized Association (Makame WMA – AA)
Roles/Responsibilities	Legal body managing the WMA and the natural resources within it. Responsible for implementing the resource plan and ensuring areas set aside for conservation are conserved. Manages finances to ensure that people and villages receive revenue from the project.
Contact person	Edward Lekaita
Title	Makame WMA Board Member
Address	Olasiti, Arusha
Telephone	+255 (0) 786 455 990
Email	**olekaita@gmail.com**

Organization name	Village Councils of Makame, Ngabolo, Ndedo, Katikati and Irushoibor villages, in Kiteto District
Roles/Responsibilities	Villages participating in the WMA mechanism are obliged to uphold and enforce the provisions of the Resource Management Plan (RMP) that defines the different management regimes for each designated areas within the WMA. They are also tasked with managing village game scouts (VGS) who are responsible for patrolling, monitoring and by-law enforcement according to the RMP.
Contact person	Meleyaki Njuldu
Title	WMA Community Officer
Address	Ngabolo Village (Makame WMA)
Telephone	+255 (0) 68 9708 472
Email	**melayekikibo@gmail.com**

Organization name	TerraCarbon, LLC
Roles/Responsibilities	Co-leads project kickoff. Designs and manages forest carbon inventory. Leads baseline development task. Develops project document and advises Carbon Tanzania on various aspects of project development.
Contact person	Mr. David Shoch
Title	Director Forestry & Technical Services
Address	5901 N. Sheridan Rd. Peoria, Illinois 61614, USA
Telephone	001-309-693-9303
Email	**david.shoch@terracarbon.com**

2.1.5 Physical Parameters (G1.3)

The project is located in the northern part of the Wildlife Management Area in the Kiteto District of Tanzania (Figure 2.2). This project area covers 104,065 hectares of Acacia-Commiphora scrub and Woodland Forest (Figure 2.8) and is located 120 km due south of Arusha, Tanzania. As depicted in Figure 2.3 and 2.4, this area is 100% forest at the start of the project in 2016 but under increasing threat from deforestation. Background information on the project area including environmental variables in and around the project region is provided in this section.

Soils
The project region is dominated by sedimentary rocks, which give rise to soils dominated by sand, red loam, clays and/or sand gravels. As per Figure 2.5, the soil types include Chromic Luvisols and Eutric Vertisols. There are no organic soils (i.e., histosols) in or around the project area or leakage belt

Climate
The climate in the project region is semi-arid with annual rainfall ranging between 500mm to 750mm, with average high temperatures range from 25 to 30ºC. The rainy season occurs between October - December and February – May.

Hydrology

While rivers and streams are present in the project region (Figure 2.6), these rivers are intermittent and only present during parts of the wet season.

Vegetation

The project area and leakage belt stratification (Figure 2.7) was based a land cover map developed as part of the Northern Tanzania Rangeland Initiative[15]. Both the Acacia-Commiphora Scrub Strata and Woodland Forest Strata are dominated by the Acacia-Commiphora ecosystem[16]. The *Acacia* genus is primarily composed of evergreen trees and shrubs in the Fabaceae family. *Commiphora* species are composed of flowering plants in the Burseraceae family. While the two strata are relatively similar in their species composition, the relative dominance of species varies between the two strata. Both vegetation types support wildlife populations, including elephant, lion, buffalo, giraffe, leopard, oryx, lesser kudu, eland, gerenuk, klipspringer, hartebeest, bushbuck, zebra, waterbuck, wildebeest, reedbuck, hyena, Thomson's and Grant's gazelle, warthog, impala, dik-dik, and wild pig.

Local communities

The Makame Savannah REDD Project is located in Kiteto District, Manyara Region, Northern Tanzania. The project is implemented within the Makame Wildlife Management Area which is composed of five villages, including Irkiushiobor, Ndedo, Ngábolo, Katikati and Makame. The total population of the WMA was 14,854 people in 2012, and Tanania's population is growing at >3%[17]. These communities engage in small scale/subsistence farming and livestock keeping. While Masai do not hunt, poaching occurs in the WMA as neighbouring communities and migrants may attempt to illegally hunt in the nearby forest areas. Fuelwood collection within the project area is sustainable and no resources extracted from the forest are for commercial markets, but rather are used for a largely subsistence livelihood. The main crops in the WMA include maize and beans.

[15] Land-cover map developed by Dan Kelly, The Nature Conservancy in Arusha, Tanzania.
[16] Fenner, M. 1982. Aspects of the ecology of Acacia-Commiphora woodland near Kibwezi, Kenya.
[17] ibid

Figure 2.1.5.a. Map of the Makame Savannah REDD project area and WMA. Mt Kilimanjaro is in the top right hand corner.

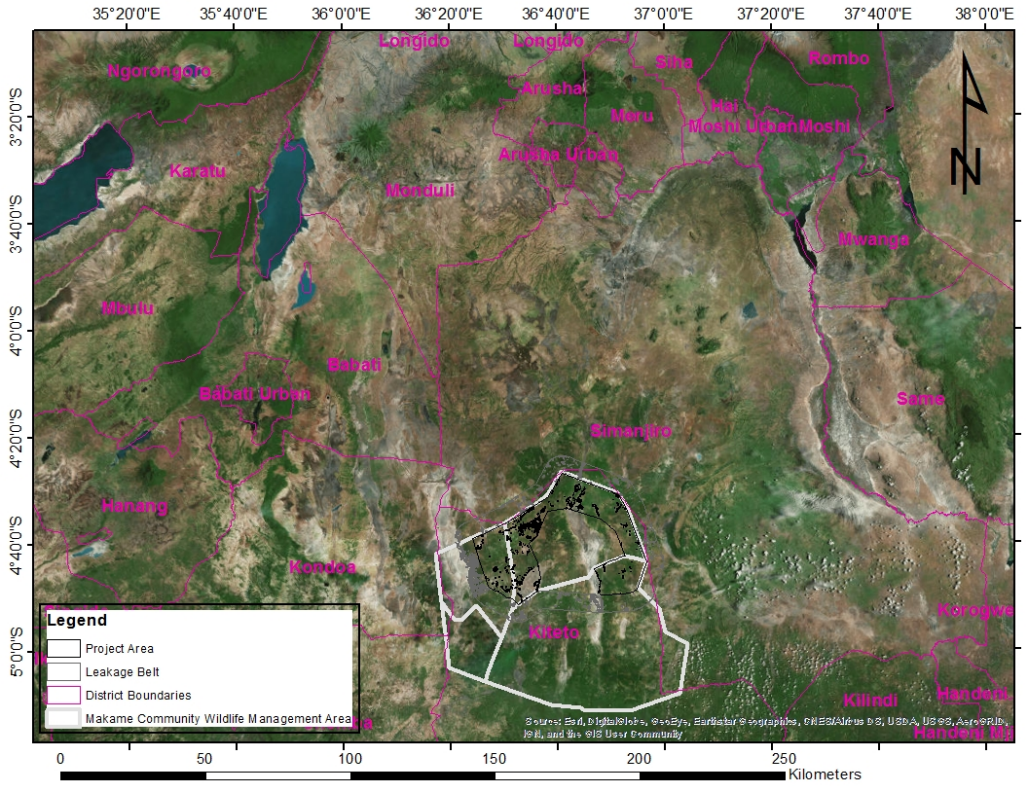


Figure 2.1.5.b. 2005 Forest Cover Map (Green = Forest; Red = Nonforest).

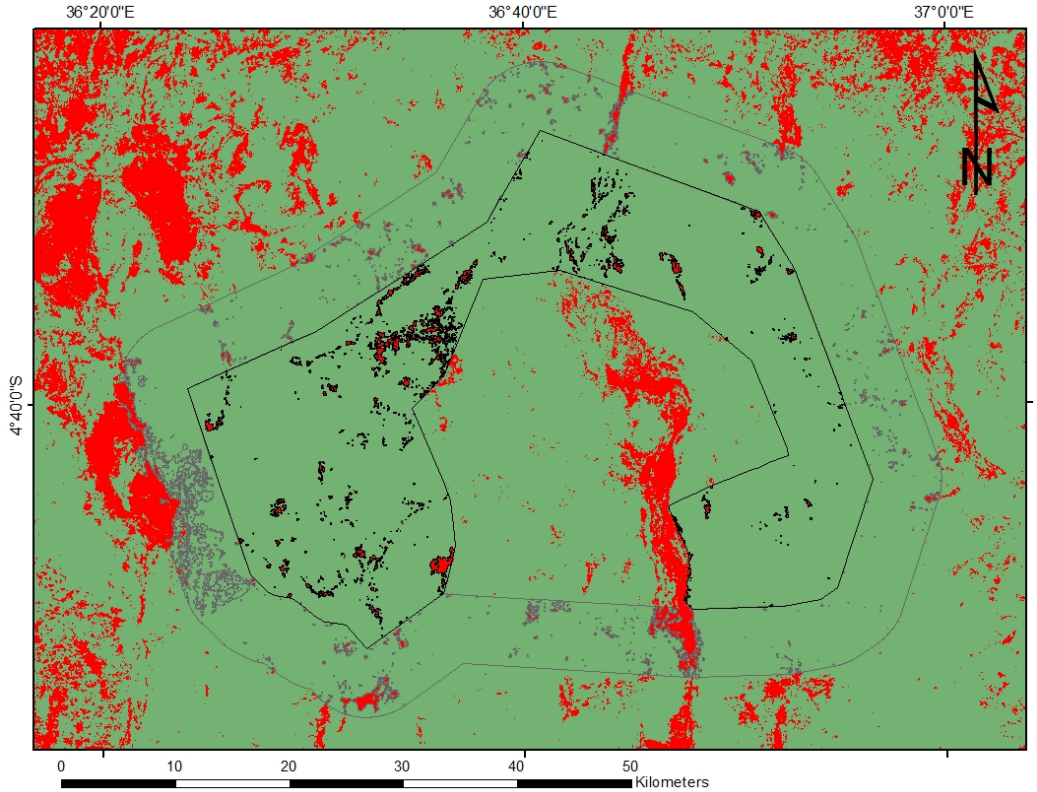


Figure 2.1.5.c. 2015 Forest Cover Map (Green = Forest; Red = Nonforest).

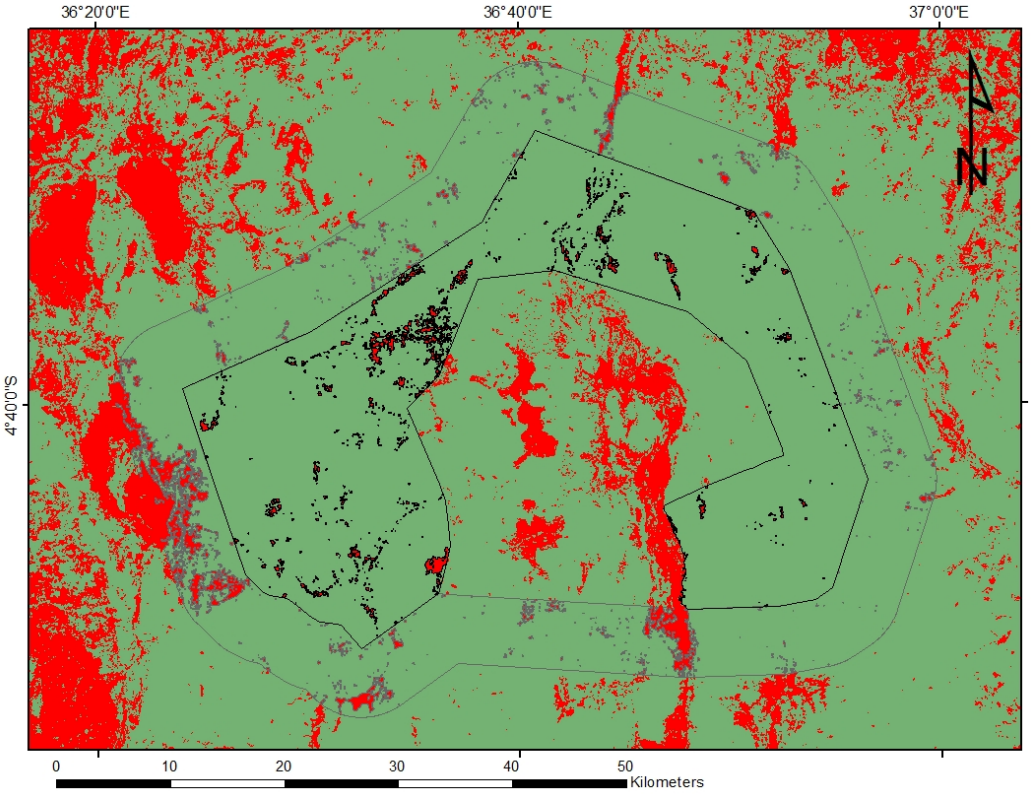


Figure 2.1.5.d. Soil type in the vicinity of the project area and leakage belt.

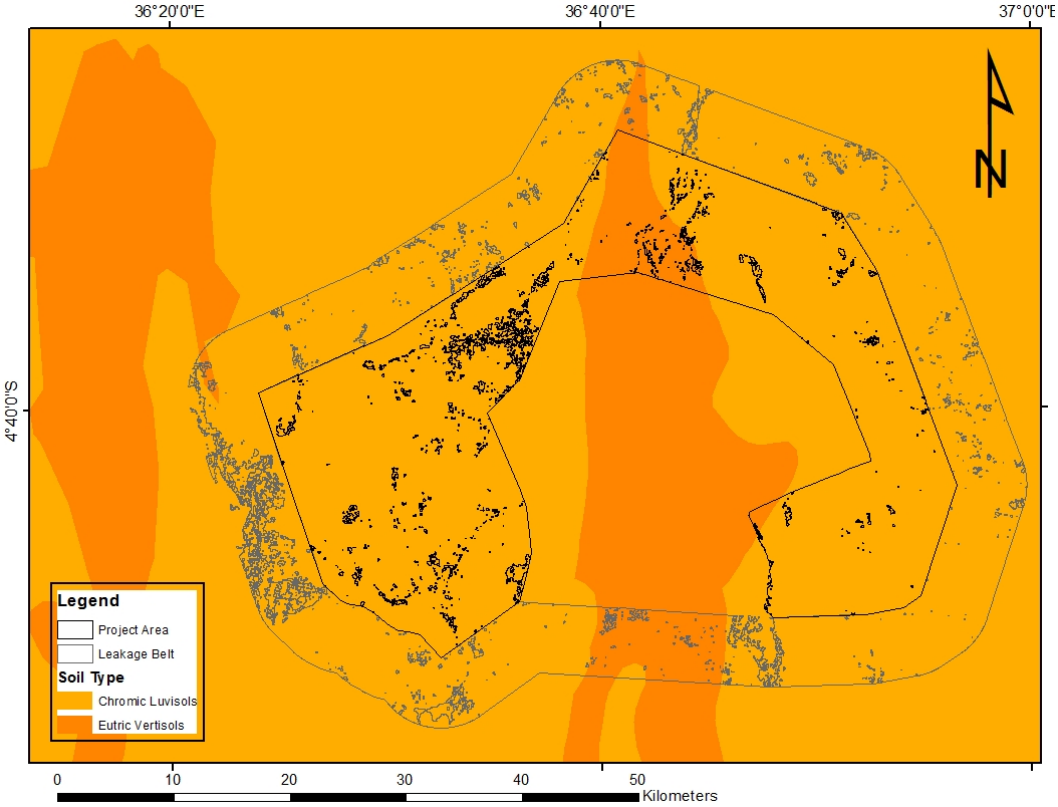


Figure 2.1.5.e. Rivers in the vicinity of the project area and leakage belt.

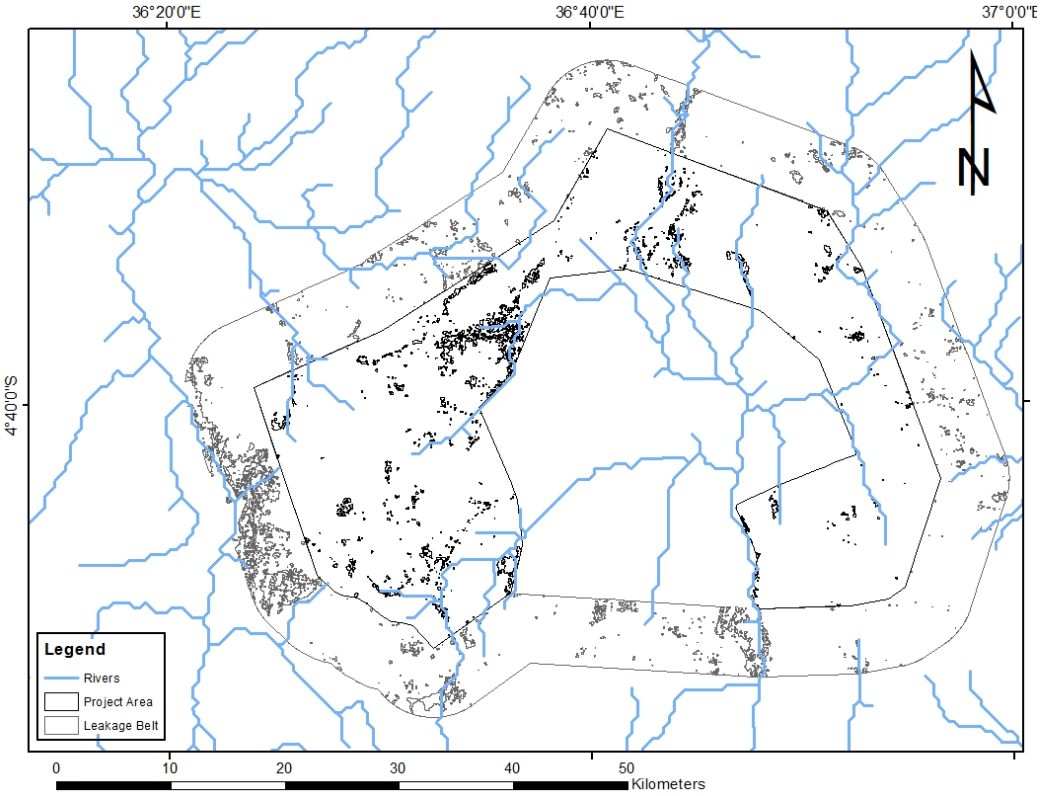
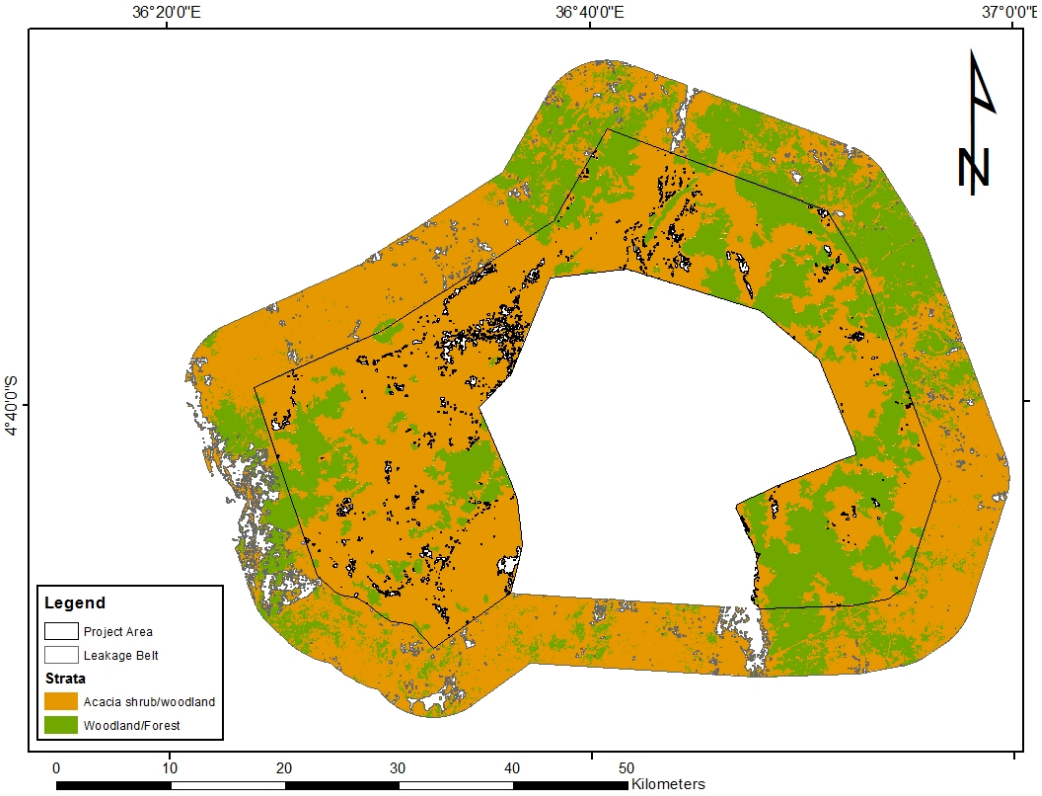


Figure 2.1.5.f. Forest strata in the project area and leakage belt.



2.1.6 Social Parameters (G1.3)

Main settlements (towns, villages, or household clusters where communities reside):

The Project Area encompasses the Makame WMA, a partnership of five registered villages within Kiteto District, Manyara Region, Northern Tanzania. The villages are Ndedo, Makame, Ngabolo, Irkiushiobor and KatiKati. Many small households (bomas) and groups of loosely aggregated households are spread throughout the settlement areas of the Makame WMA and its constituent villages in the fashion common to low density pastoralist communities. This is predominantly due to the need for large unsettled areas for grazing. Throughout the landscape, traditional boma sites and other significant places have well-known Masai names that often correspond with geological features.

Land use and economic activities (farming and pastoral practices or culture, areas of use for collection, fishing or hunting, managed and conservation lands, etc.):

The main land-use regime in the area is semi-nomadic pastoralism. The Masai people have occupied the area for over 250 years and keep cattle, goats and sheep, livestock that they communally graze in a system of regulated seasonal pastures. Alongside this traditional practice modern Bantu agriculturalists have migrated into the area as services have become available, and as access to land and markets have increased. There are a very small number of traditional hunter-gatherers of the Akie tribe known to move through the landscape throughout the year, but their numbers are very low and it is not known if a significant number still depend on hunting and gathering.

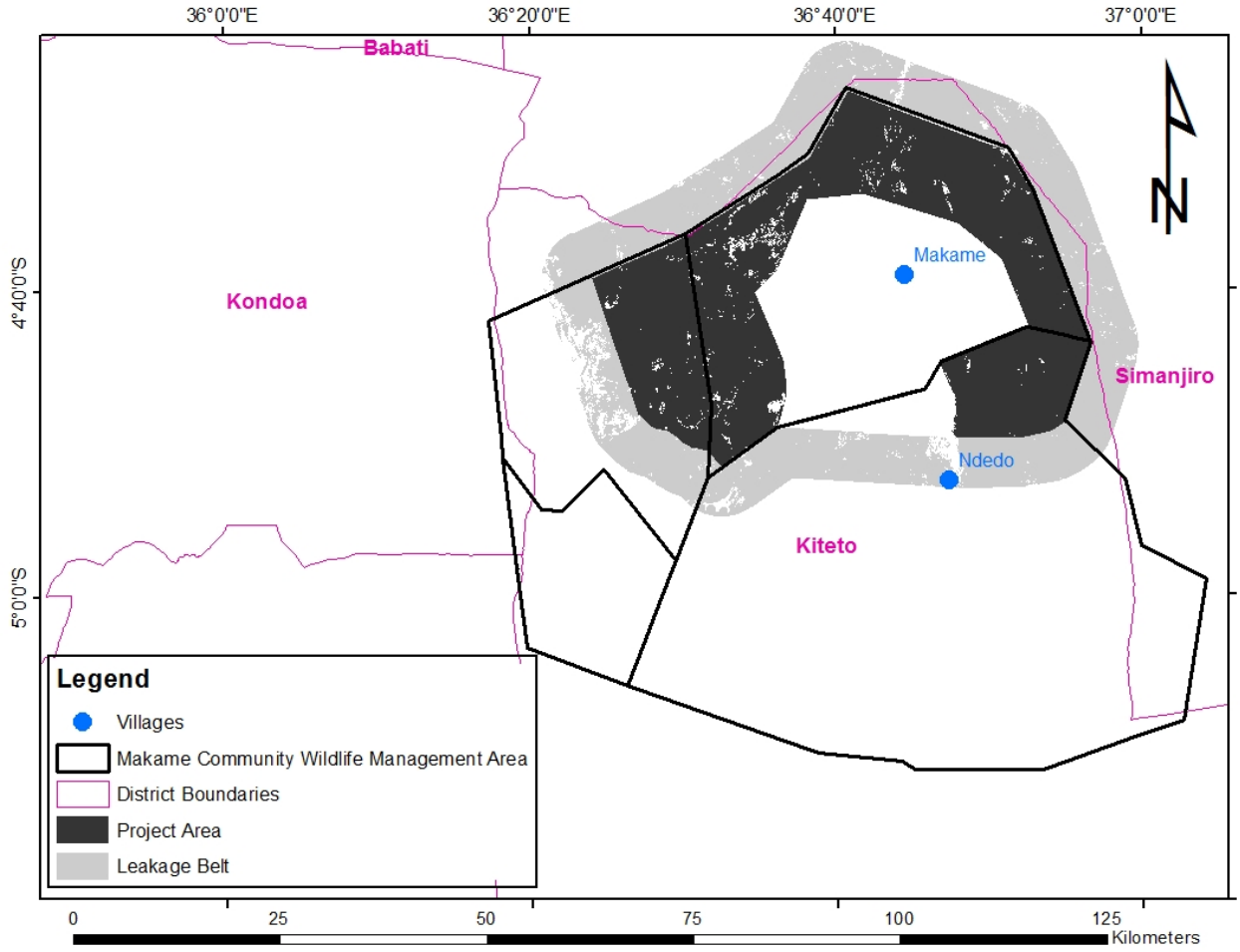
Relevant historic conditions:

Historically, agriculturalists found it difficult to settle in the area due to the lack of access to year-round fresh water. Nomadic pastoralists dug deep drinking wells throughout the landscape that allowed dry season access to “magadi” (alkaline) water for herds, but did not promote the establishment of farming communities. Services to these pastoralist communities were sporadic and unreliable throughout both the pre-colonial and colonial period. Since Independence the provision of basic services has slowly improved, but in general the area suffers from its remoteness and lack of extensive infrastructure.

Socio-cultural information (ethnicity, gender, age, household income, land ownership, education, health statistics, migration patterns, etc.).

The main ethnic group in the area is the pastoralist Masai. These are Maa speaking Nilo-Hamitic people who originated in the Nile Valley and moved south through the East African Rift Valley over the past c.2000 years, seeking new pastures for their herds and driving out or absorbing existing tribal groups along the way. More recently agriculturalists have moved into the area and practice small scale farming of predominantly maize and beans. The land is held as a community resource; each village has completed a land-use planning process that has led to the formation of the Makame WMA, and therefore the two competing land practices of pastoralism and agriculture are restricted to designated areas within each village.

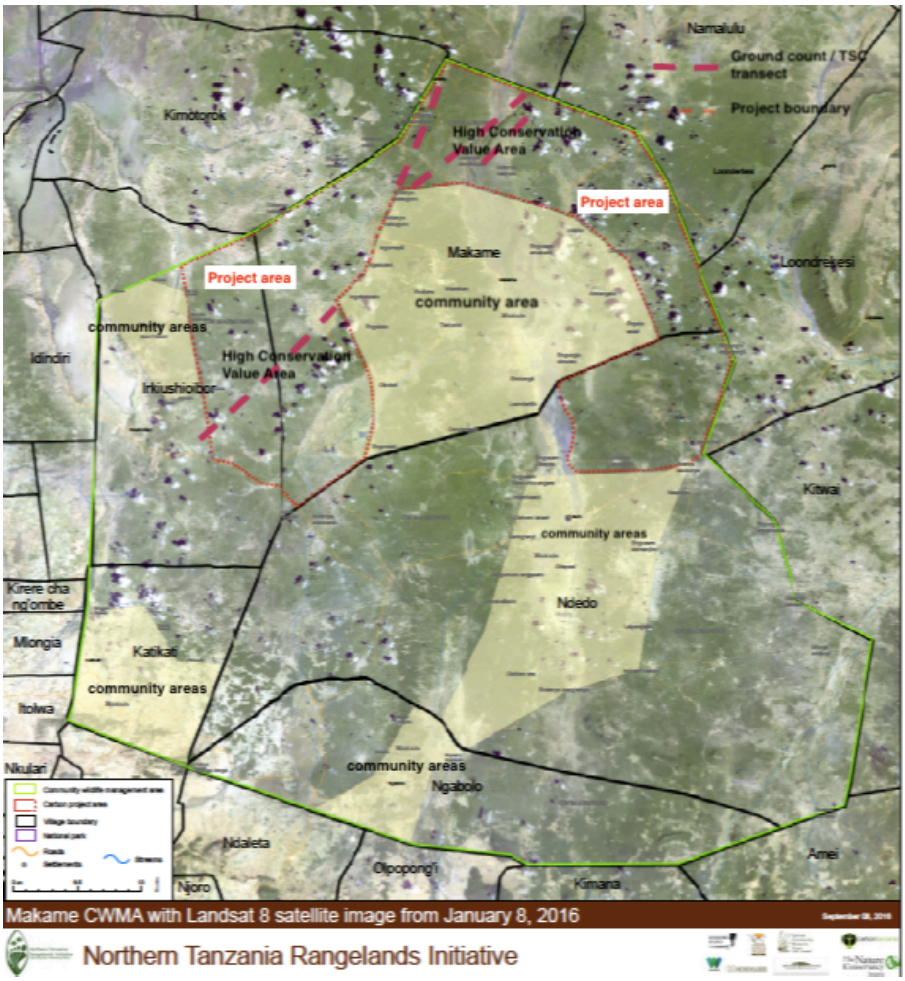
2.1.7 Project Zone Map (G1.4-7, G1.13, CM1.2, B1.2).



Makame Savannah REDD Project is not a grouped project.

Geodetic coordinates are provided in the project database in the form of a shapefile and KML file of the project area.

Figure 2.1.7. Map of Project area showing project boundary, location of communities (identified in **Section 2.1.9**). High conservation value (HCV) areas (identified in **Sections 4.1.3** and **5.1.2**).



2.1.8 Stakeholder Identification (G1.5)

To inform project activities and provide a baseline against which changes can be measured, a socioeconomic and ecological assessment of the project area was completed as part of the Endangered Ecosystems of Northern Tanzania (EENT) project under the Northern Tanzania Rangelands Initiative (NTRI)[18]. This assessment has been used to provide the following description of the communities at project start.

Villages in Tanzania are large administrative units, divided into sub-villages which can have more than a thousand inhabitants each. This survey included over 1000 randomly selected households from 17 villages across the Masai Steppe, an area from Arusha south to Makame. The table below (2.1.8.) outlines the four sampled villages in Makame, their population and the sample size.

Table 2.1.8. Village population per village

Village	No. of Household	Males	Females	Total population (2012 Census)	High Projection 2017 (National Growth Rate)[19]
Makame	1873	1683	2284	3,967	4,757
Irkiushiobor	1360	1411	1450	2,861	3,431
Katikati	1375	1397	1526	2,923	3,505
Ngábolo	823	811	855	1,666	1,998
Ndedo	1653	1534	1903	3,437	4,122
Total	**7084**	**6836**	**8.018**	14,854	17,813

The five villages defined in this project were identified based on their membership with the Makame WMA and their associated rights over the land and natural resources within the WMA. These communities rely on the WMA to derive their income as it provides grazing lands for their livestock in addition to providing resources to sustain their livelihoods and culture. These are self-organised communities; each governed by their own elected Village Council, but also bound by the jurisdiction of the WMA.

Within the communities, the different community groups were defined through an analysis of the socio-economic baseline data. A focus was put on identifying the most vulnerable or marginalised community groups, being those with less rights and wealth, or access to benefits derived from the project activities (see Table 2.1.9.)

[18] Sebastiaan Hess, Craig Leisher, Elliot Kinsey, Nathaniel Robinson, and Dan Kelly, July 2016: "Baseline Socioeconomic and Ecological Assessments for the Endangered Ecosystems of Northern Tanzania Project of the Northern Tanzania Rangelands Initiative. http://pdf.usaid.gov/pdf_docs/PA00MQPW.pdf

[19] World Bank

2.1.9 Stakeholder Descriptions (G1.6, G1.13)

The communities comprising the Makame WMA include: Irkiushioibor, Katikati, Makame, Ndedo and Ng'abolo. The Makame WMA comprises the lands of these five member villages which have established the WMA, in line with Tanzanian wildlife policy and WMA regulations. Their goal is to generate additional benefits from wildlife and other natural resources to complement their existing livelihoods. The five villages, with a total of 14,854 inhabitants as of the 2012 Census, are majority Masai pastoralist communities practicing traditional livestock management[20] and subsistence agriculture. These communities aim to use the WMA to secure communal grazing areas from external threats of land grabbing and encroachment as a major livelihood objective. They also hope to generate new forms of income from natural resources in the WMA such as tourism and REDD.

Table 2.1.9. The Community Groups and Other Stakeholders are outlined in the table below.

Community Group	Rights, Interest and Overall Relevance to the Project
Women and girls (post-excision ceremony)	Masai women practice the traditional women's role within society - tending to the cooking, milking of livestock, collecting water and firewood; and raising children. Women in Makame are slightly less educated than men, and have less access to finances. A lack of opportunities to market goods and to obtain loans are considered problems. They feel they can influence village decision making through participation in village meetings, which are said to be regularly held by Village Council, but also complain that they have no opportunity to raise concerns. Women have no access to family planning which is a sensitive topic and not openly discussed. As teenagers, girls must pass through a rite of passage into womanhood, through an excision ceremony. Overall, they crave empowerment through business and market access, as well as respect and awareness about women's rights and the work they do. The project aims to improve the livelihoods and income opportunities of women within the communities, reduce gender inequality and increase the number of women in formal leadership positions.
Children (anyone pre-circumcision/ excision[21])	According to the socio-economic baseline survey, 52% of Makame WMA inhabitants are below 15 years of age. The members of this group are either in school (just under half of primary school aged children are attending) or helping their family with work in the boma (homestead). Young boys are often sent out to herd the livestock, whilst young girls assist with cooking, milking or collecting water with their female elders. Traditionally both boys and girls pass through a rite of passage ceremony that involves circumcision or excision, the former to be recognised as men[22]. The youth define lack of road access and phone network to be significant problems within the community. They have very little access to family planning and limited healthcare. They yearn for training in business and greater access to market and loans. Per tradition, the youth have no authority to voice opinions or contribute to decision making. The project aims to increase and diversify income opportunities for youth, as well as to improve their health.
Warriors (young men)	As boys transition to warriors they take on the responsibility of protecting the village and its livestock from wildlife or hostile people. They are unable to own cattle or undertake stock duties (guarding cattle) during this time, and often spend time on walkabouts with other warriors[23]. However, changes in tradition have led to warriors grazing cattle (occurs in 16% of livestock keeping households in Makame) in order to reduce the impact of wildlife attacks on livestock. This group lacks authority to voice their opinions or contribute to decision making.

[20] National Bureau of Statistics (2002). Population and Housing Census, Tanzania
[21] Female Genital Mutilation
[22] ibid
[23] ibid

Male Elders	This group encompasses all men who have transitioned from warriors through a traditional rite of passage ceremony, which includes facing and withstanding many tests of pain and courage. This happens in their mid to late 20's and gives them the right to request things of the younger cohort of warriors. Masai culture is strongly patriarchal, where elder men decide most matters within society. Elders obtain a certain level of respect, for both their age and ownership of livestock. Junior elders are free to marry. Senior elders have the right to make decisions and voice their opinions regarding community matters. During this life stage, men will put all of their available capital into purchasing livestock, gaining more respect with a substantial and healthy herd[24]. In Makame the typical duties of the men include farming and grazing cattle.
Pastoralists	90% of households within Makame WMA derive income from livestock. This is representative of the pastoralist culture of the Masai where livestock fulfils the livelihood and cultural needs of the people. Owning a good quantity and quality of livestock is attributable to wealth and not only gains you respect, but also greater influence on community decisions. Generally, pastoralists are male, favouring the ownership of cattle, goats and sheep; but female-headed households also practice pastoralism, often favouring goats where their male counterparts favour cattle. The project is heavily tied to improving conditions for pastoralists, predominantly focused around increasing access to pasture and maintaining traditional land use patterns. There are also measures to mitigate wildlife predation of livestock.
Agriculturists	Whilst the Masai are predominantly pastoralists, it is also common to concurrently practice small-holder agricultural activities on lands within the human settlement zones. 59% of households in Makame WMA derive some income from crop farming. The large majority of these crops are maize with also some beans, sunflowers and sesame. On average plots are 11 acres in size.
Non-Masai	The non-Masai ethnicities of Makame WMA comprise 7% of household heads, who are nearly always married to someone of the same ethnicity. They are generally monogamous and agrarian. This community group is marginalised by ethnicity and may be susceptible to racism from the Masai. Being a migrant or of another tribe is identified as a reason why people do not have decision making power or influence in village meetings. Whilst the project focuses predominantly on Masai culture and tradition, it will also provide benefits to the non-Masai.
Other Stakeholders	**Rights, Interest and Overall Relevance to the Project**
Kiteto District Government	The District Government is located outside of the project area in Kibaya, the District capital. This group obtains 10 percent of the carbon benefits derived from the project. As outlined in the contract. The following outlines their responsibilities in regard to the project: - The District contributes by supporting the implementation of the NTRI-EENT project within Kiteto District. - The District Executive Officer will appoint a Liaison Officer or Contact Person from amongst the relevant Heads of Departments at the District Council, who will coordinate the involvement of the District in the implementation of this project. This Contact Person will allocate on average one day per month throughout the implementation period. If the Contact Person is requested to attend a meeting or event, the NTRI-EENT partner in charge of the event will pay per diems according to Tanzanian financial regulations.

[24] ibid

	- The project will require input from officers from the following departments: Planning, Land Use, Livestock, Community Development, Wildlife, Gender, Forestry, Health and Legal. - In the framework of the NTRI-EENT Project, partners and beneficiaries lobby for the removal of certain constraints to development in the intervention areas. This may require input from other departments. - Kiteto District will communicate in every external means of communication that the NRTI-EENT Project and activities thereof are funded by USAID.

2.1.10 Sectoral Scope and Project Type

Project Scope 14: Agriculture, Forest and other Land Use (AFOLU)

Project Category: Reducing Emissions from Deforestation and Degradation (REDD)

Type of Activity: Avoided Unplanned Deforestation (AUDD)

Grouped project: No

This project is being registered under the Verified Carbon Standard (VCS) and Climate, Community & Biodiversity Standards (CCBS) as a Reducing Emissions from Deforestation and Degradation (REDD) project. It has been developed in compliance with the Verified Carbon Standard[25], Version 3.7 and VCS AFOLU Requirements[26], and Climate, Community & Biodiversity Standards, Version 3.1[27]. The project will reduce emissions from unplanned frontier deforestation.

2.1.11 Project Activities and Theory of Change (G1.8)

Project Activities:

The overarching aim of the project is to support the enactment of the Makame WMA Resource Management Plan (from here on referred to as the RMP or 'resource plan'). The Project Proponent will distribute finances, provide support and implement the monitoring program but the activities themselves will be implemented by the Authorised Association on behalf of the WMA. The following project activities (see Table 2.1.11 below) aim to enforce the resource plan were developed through The Nature Conservancy's Conservation Action Plan (CAP) Methodology (The CAP workshop was held in Makame from the 16th-19th of August 2016).

Stakeholders who participated in the Conservation Action Plan included Makame WMA leadership, representatives from the Authorized Association Consortium (AAC), District Commissioner, District Community Development Officer, District Game Officer, District Land Officer, District Administrative Secretary, Police Officer Commanding District, Chancellors, representatives from key community groups including women, youth and elders, representatives of Non-governmental organisations, Carbon Tanzania and facilitators from The Nature Conservancy and Tanzania People & Wildlife. Appendix 1 illustrates stakeholder details.

[25] VCS. 2017 VCS Standard. Version 3.7, 21 June 2017. Verified Carbon Standard, Washington, D.C.
[26] VCS. 2017 Agriculture, Forestry and Other Land Use (AFOLU) Requirements. Version 3.6, 21 June 2013. Verified Carbon Standard, Washington, D.C.
[27] CCBS. 2017 Climate, Community & Biodiversity Standards, 3rd Edition. Version 3.1, 21 June 2017. Verified Carbon Standard, Washington, D.C.

Theory of Change:

The project's theory of change is based on the idea that through project activities we can ultimately generate through casual chains significant beneficial changes to the community and to the management of natural resources. It is based on "IF … THEN" relationships linking the project activities, outputs, outcomes and impacts as shown in Figure 2.1.11.



Figure 2.1.11 Casual chain underlying the theory of change

Table 2.1.11 outlines the project activities and how they fit into the project theory of change. For example, the first activity under target 1 can be understood as:

IF anti-poaching/illegal grazing enforcement is increased THEN land security will increase and improved conservation of natural resources and provision of ecosystem services will result.

Table 2.1.11. Project activities and theory of change

ACTIVITIES	OUTPUTS	OUTCOMES	IMPACTS	HUMAN IMPACTS
TARGET 1				
Anti-poaching/illegal grazing	Increased law enforcement	Increased security of land	Protection and conservation of natural resources in WMA	Improved provision of ecosystem services (medicinal plants, reduced dust levels, reduced erosion, prevention of siltation of water holes and dams)
	Increased patrol hours and coverage	Decreased poaching and illegal grazing		Especially adequate pasture for livestock
Marking boundaries with signs	Community understanding of resource management plan and zone boundaries	Better pasture quality/quantity		Sustainable and conflict free pastoralism
	No deforestation in project area	Carbon stays in forest, community receives carbon revenue		Income from tourism
Conservation awareness campaign	As above	As above		Food security
Establish carbon payment scheme	Financial incentive for community to conserve the forest	No deforestation in the project area		Security and sustainability of livelihoods
		Better adherence to the resource management plan		

TARGET 2				
Conduct climate change analysis and climate change adaptation workshop	Regional level climate change analysis and community level understanding of impacts and adaptation	Climate change is recognised by District Government and communities. Communities identify threats to their lifestyle	Climate change adaptation is incorporated into planning	Improved grazing, seasonal management of resources and water availability for livestock and wildlife
Develop a business plan for Makame WMA	Provides a tourism pathway for WMA	Better managed tourism industry	Promotion of tourism in Makame WMA and natural resource conservation	Increased community resilience
	Better decision making			
Increased hunting tourism	Increase number of hunting tourists	Increased tourism revenue for WMA		Increased employment opportunities, especially favouring youth
		Creation of employment opportunities within communities		Improved provision of ecosystem services (medicinal plants, reduced dust levels, reduced erosion, prevention of siltation of water holes and dams)
		Increased protection of wildlife, less poaching		Revenue source for community development
TARGET 3				
Income/expenditure postings	Create transparent expenditure	Increased confidence in the WMA	Improve livelihoods of Makame WMA communities	Improved quality of life
	Increased trust & confidence in leaders	Greater respect for the resource management plan		Enhanced well-being
	Empowerment of community members over finances			Greater community cohesion
Financial accountability to community	Equitable distribution of community income	Improved service provision		Increased community resilience
		More efficiency in community development projects		Greater stability
TARGET 4				
Review resource management plan	Create more relevant resource management plan	Resource ownership	Secure land rights for WMA and natural resource conservation	Eliminate poverty through resource ownership
Stakeholder agreement on resource management plan	Maintain community resource ownership			

Authenticate resource management plan with government	Ensure stakeholder understanding of the plan			
Share new resource management plan accordingly				
TARGET 5				
Support traditional grazing zones and by-laws	Decreased unlawful grazing and land use	Better availability of graze lands throughout the whole year	Protect and maintain the culture and tradition and natural resource conservation	Security and sustainability of livelihoods
		Improved rangeland health		Food security
		Healthy cows		Wealth
		Increased connectivity for cattle and wildlife across the landscape		Formalization of grazing rights
		Resilience and sustainability of pastoralism		
TARGET 6				
Governance training for WMA leadership	Improved capacity to manage natural resources	Better implementation of the resource management plan	Strengthen governance, improve livelihoods and natural resource conservation	More trust and confidence in leadership and the WMA structure
Governance training for village leaders & comm. members	Improved capacity to manage natural resources	Improved management of the WMA		Improved service provision
Governance training for women's leadership groups	Improved capacity to manage natural resources			Improved livelihoods
Ensure female representation in leadership	Better integration of women into decision making	Consideration of women in community decisions		Empowerment of women
		Empowerment of women		Increased gender equality

2.1.12 Sustainable Development

The Wildlife Policy (1998)

There are several strategies that promote management of Wildlife Management Area by the local governments. A strategy for conserving and managing wildlife resources clearly states that wildlife management responsibility of the settled and areas outside core protected areas (National Parks, Ngorongoro Conservation Area and Game Reserves) shall be devolved to rural people and the private sector. A strategy for protecting wildlife aims at devolving responsibility of containing illegal use of wildlife in WMAS to rural communities. A strategy for protecting biological diversity established a new category of protected area to be known as Wildlife Management Area for the purposes of effecting community-based conservation. A strategy for ensuring that wildlife conservation competes with other forms of land use aims at involving rural communities and other stakeholders in taking joint responsibility for the sustainable management of wildlife and other natural resources. Strategies for recognising an intrinsic value of wildlife to rural communities aims at encouraging resident hunting which benefit rural communities in WMAs on those land hunting is conducted.

The National Land Policy (1995)

This promotes land tenure systems, facilitating social and economic development, without upsetting the ecological balance of the environment. It is noted in the policy that wetlands have often been regarded as wastelands and considered useless for social and economic development; the policy seeks to reverse this negative perception by proposing that wetlands are properly studied.

The National Tourism Policy (1999)

The policy recognises that most tourist attractions lie within local communities or in their vicinities and in most cases co-exist side by side with the communities in wildlife areas. It is for such reasons that it is imperative for communities living within or around these areas to be fully involved in the development and management of these attractions and in addition, to get a share of the income generated from tourist activities within their areas. Formation and subsequent management of WMA would help communities to participate in the process of tourism management in Tanzania.

2.1.13 Implementation Schedule (G1.9)

Date	Milestone(s) in the project's development and implementation
April 27th, 2016	Project start date MoU signed between Carbon Tanzania and Kiteto District
August 2016	Consultative meetings with communities – introduction of project aims and requirements
September 2016	Climate change adaptation workshop and presentation of climate change analysis.
January 2018	Implementation of biodiversity monitoring plan
March 1, 2018	Complete PD
March 2018	Resource Zone Management Plan completed and signed
April 1, 2018	Registration of the project
June, 2019++	Validation and Verification of project activities.
December, 2019	First request for issuance of VCUs from project
April 26th, 2026	End date of the first REDD baseline period.
April 27th, 2026	Start of second baseline period. The baseline must be renewed every 10 years from the project start date.
April 26th, 2026	End date of the second REDD baseline period.
April 27th, 2036	Start of third baseline period. The baseline must be renewed every 10 years from the project start date.
April 26, 2046	End of project contracting, crediting period and third baseline period.

++Verification will initially be carried out after 3 years and from then at least every 5 years.

2.1.14 Project Start Date

The Makame Savannah REDD Project has a project start date of April 27th, 2016. On this day, the Memorandum of Understanding (see appendix) between Carbon Tanzania, the Makame Wildlife Management Area Authorized Association, and the Kiteto District was signed leading to the start of project activities aimed at protecting and conserving natural resources including reducing deforestation.

The engagement with the Kiteto District council by the entire NTRI partner group marks the point at which the joint strategies for landscape scale conservation and livelihood improvement were formally introduced in the area, a time against which we can measure future and continuing impacts.

2.1.15 Benefits Assessment and Crediting Period (G1.9)

The Makame Savannah REDD Project has an initial project crediting period of 30 years, starting on April 27th, 2016. The initial project crediting period is set to end on April 26, 2046. The initial baseline period started on April 27, 2016 and is set to continue through April 26 2026.

2.1.16 Differences in Assessment/Project Crediting Periods (G1.9)

There are no anticipated differences between the GHG emissions accounting, climate adaptive capacity and resilience, community, and/or biodiversity assessment periods.

2.1.17 Estimated GHG Emission Reductions or Removals

Table 2.2. Ex-ante estimate of emission reductions generated by the project.

Years[28]	Estimated GHG emission reductions (tCO2e)
2017	3,343
2018	26,443
2019	70,147
2020	115,964
2021	118,927
2022	162,793
2023	170,188
2024	207,148
2025	249,020
2026	240,140
Total estimated ERs	1,364,112
Total number of crediting years	10
Average annual ERs	136,411

[28] Please note, the convention throughout this document is that each carbon accounting year refers to the period from April 27th of the previous year to April 26th the designated year. For example, the year 2017 refers to April 27th, 2016 to April 26, 2017.

2.1.18 Risks to the Project (G1.10)

Possible natural and human-induced risks to the expected climate, community, and biodiversity benefits during the project lifetime and outlined measures needed and designed to mitigate these risks.

Table 2.1.18. Risks, impacts and actions.

Identify Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed and designed to mitigate the risk
Poaching	Decrease biodiversity through poaching of target wildlife species	Anti-poaching activities – patrols, signage, purchasing of more vehicles to conduct patrols, increasing awareness of community members about conservation and the rules of the resource plan, strengthening and authenticating land rights
Weak leadership / governance / limited allocation of income	Inability to implement project activities could negatively impact the climate, community and biodiversity; ultimately leading to a failed project and no income generation from carbon credits	Leadership training and capacity building activities for the WMA leadership and village leadership teams, measures to increase transparency around income and expenditure of funds
Climate change / drought	Decrease availability of pasture and water for livestock and wildlife. Resulting in livestock deaths causing poverty to pastoralists and their families. Lack of appropriate habitat for wildlife resulting in reduced biodiversity and opportunities for tourism.	Reducing deforestation – reduces carbon emissions and creates a better local ecosystem. Diversification of livelihood sources to reduce reliability on livestock.
Disregard or misunderstanding of resource plan / environmental destruction	Negative impacts on Climate, Community and Biodiversity are possible as the resource plan is designed to provide climate, community and biodiversity benefits. Poor resource management will affect all citizens and their livestock, create conflict in the community, cause damage to wildlife habitat and create unwanted carbon emissions potentially reducing or removing PES.	Ensure participatory development of the resource plan, enforce management zones with signage and patrols, create a conservation awareness campaign educating community members about the values underlying the resource plan and climate change
Invasion of WMA land by outsiders	Conversion of land from forest to agriculture will release carbon emissions exacerbating global warming and decreasing available habitat for wildlife or pasture for livestock. Illegal use of Makame WMA resources will create conflicts amongst communities, potentially leading to violence.	Regular patrols, signage, purchasing of more vehicles to conduct patrols, increasing awareness of community members about conservation and the rules of the resource plan, strengthening and authenticating land rights

2.1.19 Benefit Permanence (G1.11)

Carbon Tanzania and its partners have conducted capacity building and training within the communities and WMA entity. In addition, project partners Creating tourism opportunities Reframing and reinvigorating the resource plan Community understanding of the potential for forest conservation to create and maintain pasture.

2.1.20 Financial Sustainability (G1.12)

This project has received donor funds through USAID as part of the EENT project. These funds have been used to establish the project activities and to ensure full certification under the VCS-CCB standard. Carbon Tanzania has experience marketing REDD+ credits on the global market, and has used this applied experience to form conservative estimates for expected annual credit sales for the Makame Savannah REDD+ Project. Additionally, the Project Proponent's combined REDD+ project development experience have contributed to a detailed financial model for the development and management of the Project. Predicted credit sales and an accurate estimated annual budget demonstrate sufficient cash flow from predicted contracted sales to sustain the project through the end of the crediting period. Documents supporting these investments can be produced to the project auditor for inspection. Carbon Tanzania has equity investors and a concise business plan and financial modal that are available on request. The project partners are all well-funded, sufficiently capitalized organizations, and include a major international NGO (The Nature Conservancy), local Tanzanian NGOs with impressive histories of financial sustainability (UCRT, Honeyguide).

2.2 Without-project Land Use Scenario and Additionality

2.2.1 Land Use Scenarios without the Project (G2.1)

The conditions existing prior to project initiation include those described in section 2.1.5. Further these conditions are the same as the baseline scenario as described in section 3.1.4. As detailed in section 3.1.5 on additionality, there are significant cost barriers associated with implementation of this project. The project has not been implemented to generate GHG emissions for the purpose of their subsequent reduction, removal or destruction but rather to implement the Makame WMA Resource Management Plan (i.e., the 'resource plan) in which one of the central tenants of this plan is the protection and conservation of natural resources.

2.2.2 Most-Likely Scenario Justification (G2.1)

The most-likely scenario is the continuation of the pre-project land use including the lack of full implementation of the WMA Resource Management Plan as documented in section 3.1.4.

2.2.3 Community and Biodiversity Additionality (G2.2)

Whilst the Makame WMA RMP provides for protection of forest areas within the project area, the reality of unregulated agricultural expansion in the larger landscape indicates that without enhanced capacity and financial incentives, the communities would not be able to follow their own plan and protect the designated resources. This would result in a degradation of habitat, a loss of biodiversity, grazing resources and an undermining of land-rights.

The WMA and village communities set up Makame in 2006 with an expectation that hunting tourism revenue would provide the funds to enforce the WMA RMP, this has not been realised (see section 3.1.5.). In addition, revenue from hunting tourism is declining in Tanzania[29] due in part to a lack of wildlife but also

[29] Revelian, M.(2016) Contribution of hunting tourism to Tanzania economy. MSc Thesis. SUA.

due to policy challenges[30] and in part due to external factors such as the banning of trophy imports to the European Union and United States of America. This decline in hunting requires an alternative system to value these areas, indicating that the additional revenue from the REDD project will contribute significantly to ensuring that the Resource Management Plan is implemented and strengthened in the face of imminent external land pressures.

The scenarios outlined above are consistent with enforced mandatory applicable laws and regulations. WMAs are created with the approval of the district governments and are given formal legal designation through the national Wildlife Conservation Act of 2009 and governed by WMA regulations enacted in 2012. However, no national or district government funds are made available for the management of WMAs, nor are there any finance requirements imposed on the management of WMAs.

2.2.4 Benefits to be used as Offsets (G2.2)

N/A

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

All project documentation will be copied and stored with the Makame WMA AA office situated in Makame Village. Project documentation will also be translated and presented to all five Village governments, and women's forums within those villages. This includes copies of the RMP translated into Swahili and the RMP map that will be produced and sent to every village to support awareness. This map contains local Maa names for areas and the REDD project boundaries.

2.3.2 Dissemination of Summary Project Documents (G3.1)

Summary documentation describing the proposed project activities and its requirements have been translated into Swahili and shared with all community groups at all levels of administration through consultative workshops and specific training sessions. Carbon Tanzania has set in place a Carbon Champions program, training young men and women from each of the five villages in climate change and project development. These carbon champions have travelled to all villages and sub-villages to inform people in Maa about this REDD project.[31]

2.3.3 Informational Meetings with Stakeholders (G3.1)

During project development and early stage implementation various informational meetings were held with stakeholders at the local and district level. All these meetings were aimed at increasing stakeholder understanding of the project, including identifying informational gaps to be addressed by later meetings and trainings. Some meetings and trainings were conducted in both Kiswahili, the national language, and Maa, the tribal language, to allow as many stakeholders as possible full access to information. Formal informational meetings with stakeholders were held as follows;

May 2016: Carbon Tanzania representatives were invited to a board meeting of the Makame WMA AA where they introduced the concept of the REDD project.

May 2016: The Carbon Tanzania management attended a Kiteto District Council meeting to introduce the concepts and requirements of the REDD project.

[30] https://tnrf.org/files/E-TNRF-Information_Brief_3.pdf
[31] Documentation on this training and attendees lists are available.

August 2016: Consultative meetings were held with both members of the Makame WMA committee and representatives of the five participating villages to explain the respective responsibilities of each stakeholder in the proposed REDD+ project.

May 2017: Meetings with full Makame WMA board (including village representatives) and executives to negotiate the terms of contract which forms the basis of the REDD project activities. Carbon Tanzania then signed this contract with Makame WMA.

July / August 2017: Multiple grassroots led training sessions for representatives of both Makame WMA and village communities in the local language (Maa) to sensitise general community members to the aims and requirements of the REDD project.

Due to these developmental and early stage meetings as well as other informal methods of information dissemination by Carbon Tanzania and our partners, stakeholders now have a good understanding of the project. This process will continue throughout the project duration as stakeholder understanding of the project has been identified by Carbon Tanzania to be a core component of successful project execution.

2.3.4 Community Costs, Risks, and Benefits (G3.2)

Information about Community Costs, Risks, and Benefits was exchanged and discussed during consultative meetings and contract negotiations in 2017. A more detailed look at Community Costs, Risks, and Benefits and their communication to the community can be found in sections 4.5.3 and 4.5.7.

2.3.5 Information to Stakeholders on Validation and Verification Process (G3.3)

Information to stakeholders on Validation and Verification process was provided at the same time and using the same channels as other project operation information previously addressed. This process is elaborated on in section 1.1.3.

2.3.6 Site Visit Information and Opportunities to Communicate with Auditor (G3.3)

Communication with the Makame WMA is mediated through both formal channels (printed and signed letters) and less formal channels such as emails, WhatsApp and instant messages. Carbon Tanzania enhances these communication channels with assistance from its partner in the landscape UCRT, and through these methods they will communicate the site visit information and other requirements of the Validation visit.

2.3.7 Stakeholder Consultations (G3.4)

The review and amendment of the RMP is the key intervention of the community in terms of the design of the project. The areas to be protected are defined through this community led process and as such this can be considered to be the foundation of stakeholder engagement in the project process. Methods of protection are also primarily decided by the stakeholders themselves as outlined in the RMP, though they will have access to consultation from district government and local experts.

2.3.8 Continued Consultation and Adaptive Management (G3.4)

Our partner in the landscape, UCRT, will play the role of informing continued review, and advising adjustment of the project activities to better deliver the intended outcomes. Its regular presence in village council and WMA meetings ensures that Carbon Tanzania will receive information and feedback about potential issues with project implementation as soon as they arise.

2.3.9 Stakeholder Consultation Channels (G3.5)

Channels of consultation are multi-leveled. Channels are open between Carbon Tanzania and individual community members, as well as with the community and the leadership of the WMA entity. With-in these

levels exist both informal (phone calls, face to face conversations) and formal (bi-annual meetings, appeals committee) mechanisms. The WMA is a legitimate entity based on participation and buy-in from the communities it encompasses, and made up of community members, this legitimizes the consultations and participatory process that Carbon Tanzania engages with it in. Our Partner UCRT also provides a separate and independent consultation channel available to the community at all levels, and are experts in community engagement including around cultural and gender issues. Carbon Tanzania is satisfied with the level of information sharing that has occurred to date and the first awareness assessment conducted supports this belief.[32]

2.3.10 Stakeholder Participation in Decision-Making and Implementation (G3.6)

The WMA structure is designed specifically to be a participatory entity that encompasses all the stakeholders in the area under WMA supervision. This purpose is once again outlined and cemented by the RMP. The project developer deals directly with the WMA entity and thus ensures stakeholder participation in the decision-making and implementation of the project. Our partner UCRT will act as a secondary insurance method to guarantee true stakeholder participation in decision-making, and implementation are taking place. Their presence in village council, women's forums, and WMA meetings will allow us to effectively monitor the functionality of the decision-making process, especially in regards to sensitive cultural and gender aspects that may be involved.

2.3.11 Anti-Discrimination Assurance (G3.7)

Carbon Tanzania has company policies to prevent discrimination and outline a course of action, should it occur, the human resource (HR) policy provides a clear statement on discrimination relating to gender, religion or sexual discrimination. Discrimination is considered a level A misconduct under the HR policy. Where discrimination occurs within the company, partner organisations or within project areas (project participants), actions are outlined in the grievance policy to ensure that any discrimination is dealt with by the senior management. All company employees and field partners sign a code of conduct with CT that includes anti discrimination.

2.3.12 Feedback and Grievance Redress Procedure (G3.8)

Carbon Tanzania has a clear grievance redress mechanism which is outlined in the company grievance policy. The grievance policy is also part of the files kept at the VDC office. The policy defines a grievance and its scope and outlines both an informal and formal procedure for managing grievances. Under the informal procedure, affected person first discuss with a director or another member of the management team. The director will attempt to resolve the grievance on an informal basis, taking advice if necessary from other parties. The director and affected person will work together to resolve the problem. If a grievance cannot be resolved via informal discussions, the formal procedure may then be used. The formal procedure requests the grievance to be in written form (or if not possible, by telephone to the director). An investigation is arranged within 1 week (7 days) to gather additional information, followed by a grievance hearing. The hearing should occur within 10 working days of the investigation being completed. Additional details, including the contact numbers of the directors, are included in the grievance policy, available in both English and Swahili.

2.3.13 Accessibility of the Feedback and Grievance Redress Procedure (G3.8)

Accessibility of the feedback and grievance procedure is ensured as grievances can be reported at multiple levels. Individual community members have direct communication access to Carbon Tanzania staff, the community has bi-annual meetings designed for this specific purpose, and the leadership have direct formal channel to air grievances and general feedback. UCRT will also engage in this process, as they are highly active at the grassroots level in the community and are a neutral group. Furthermore, the concept of feedback and grievance and the channels of using the mechanism have been explained to the community at all these levels.

[32] Carbon Champions Assessment Report, 2017

2.3.14 Worker Training (G3.9)

Makame WMA RMP is designed to promote sustainable community development and to consistently improve the quality of conservation. Makame WMA is committed to involving the community in its program of work, and to contributing toward sustainable local development. There is a preference for hiring local people. Candidates from the local community who meet a position's requirements are given preference in hiring decisions. It is important to note that there is a lack of individuals with advanced technical or professional studies in the local area and therefore this type of service has to be contracted from outside the communities.

All Makame WMA personnel receive training through the administration and operations program (See RMP) when they are hired, including content related to professional ethics and conduct as part of the institutional culture. Staff evaluations and staff training are part of the RMP (See section 6.1.4. of the RMP). New employees are informed through briefing about their legal rights, anti-discrimination laws and policies and methods of resolving problems and formalizing complaints within the organization. With regards to adherence to host country laws regarding workers' rights, the project proponent, to the best of its knowledge, complies with all relevant national laws, including labor laws.

2.3.15 Community Employment Opportunities (G3.10)

Sourcing employees from the community is crucial to Carbon Tanzania as creating local employment is one of our main company goals. All community members regardless of age, sex, gender etc. will be given an equal opportunity to fill all work positions including management. Positions will not be open to non-community members unless it is determined that the capacity does not exist locally and cannot be built immediately. The only perceived barrier will be based on job requirements and even here Carbon Tanzania is committed to doing whatever necessary to source all project employees directly from the community, including helping build capacity of community members to fulfill job requirements that they may not have met at project outset. The community run WMA entity will be tasked with most of the selection of workers however Carbon Tanzania will have input, especially on behalf of ensuring women, youth, and any marginalized people are given a fair chance to fill positions for which they are well suited or can be subsequently trained.

2.3.16 Relevant Laws and Regulations Related to Worker's Rights (G3.11)

Tanzania overhauled its employment and labor laws in 2004 when it enacted the Employment and Labor Relations Act, Act No. 6 of 2004 ("the Employment Act") and the Labor Institutions Act, Act No. 7 of 2004 ("Labor Institutions Act"). The Employment Act provides for labor standards, rights and duties, the Labor Institutions Act constitute the governmental instruments charged with administering the laws. In 2007 additional legislation was added to facilitate the enforcement of labor rights and standards stipulated in the Employment Act. One of the most significant of these is the Employment and Labor Relations (Code of Good Practice) Rules, G.N. No. 42 of 2007. Carbon Tanzania is organizationally committed through internal policy to following these laws. All employees receive a briefing on laws and worker's rights in Tanzania and receive a copy of the Carbon Tanzania company policy documents.

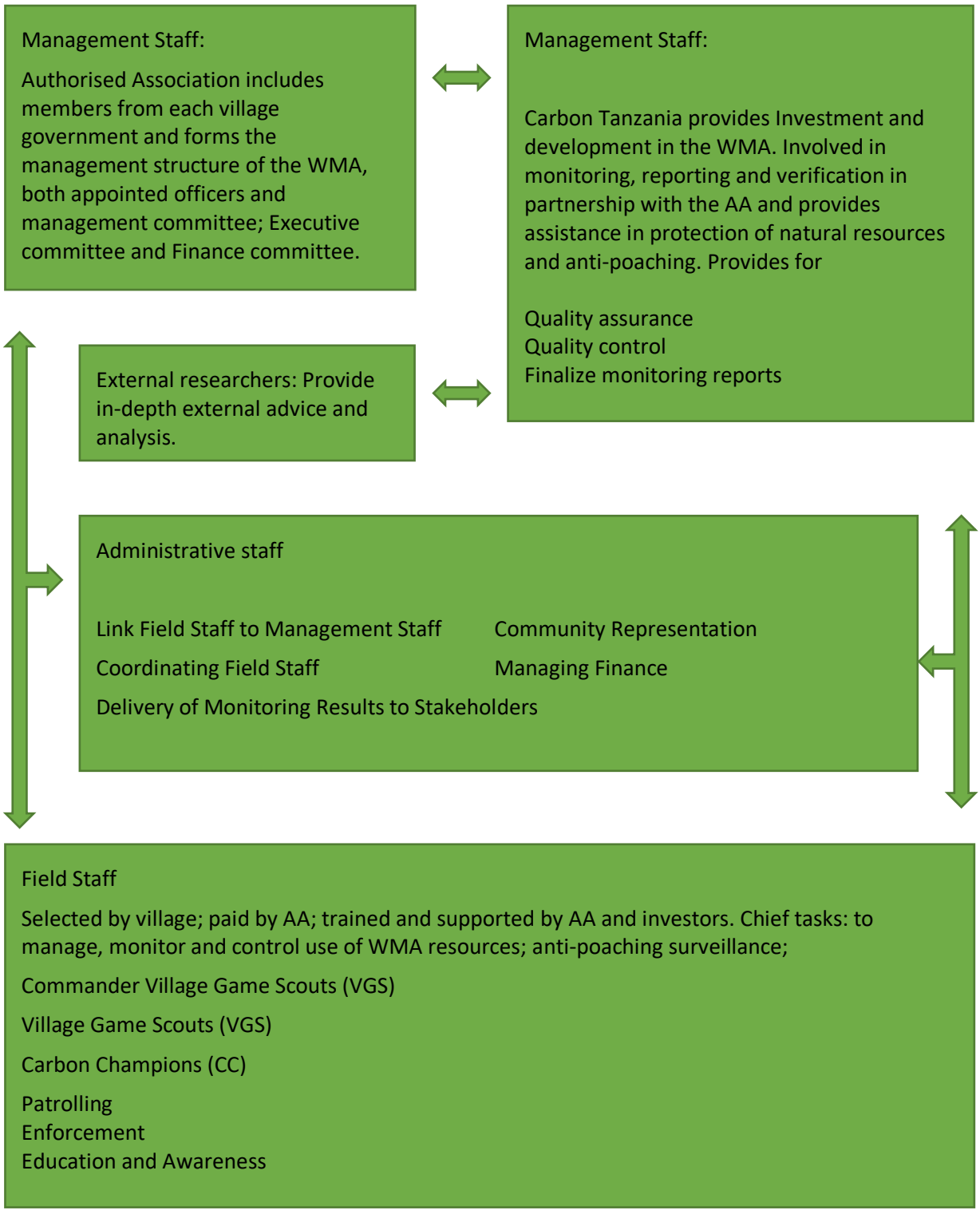
2.3.17 Occupational Safety Assessment (G3.12)

Work within Carbon Tanzania and Makame WMA includes low-level risks typically associated with activities conducted in sites with little infrastructure and irregular conditions. The level of risk varies depending on the type of employment in Makame WMA and the associated activities, although none of the work requires undue exposure to risks. Work in the WMA does not require the operation of heavy machinery or vehicles larger than the rangers' pickup trucks. All Carbon Tanzania field staff have first aid training and all vehicles carry first aid kits. Carbon Tanzania through WMA structures provides assistance to injured project

participants. Carbon Tanzania policy instructs participants to avoid to the best of their ability situations which pose unnecessary risk to personal safety. As participants live with-in and often traverse the landscape risks like exposure to dangerous animals, snake bites, etc. are unaffected by employment in the WMA. Carbon Tanzania discourages the use of weapons in any project related activities.

2.4 Management Capacity

2.4.1 Project Governance Structure (G4.1)



2.4.2 Required Technical Skills (G4.2)

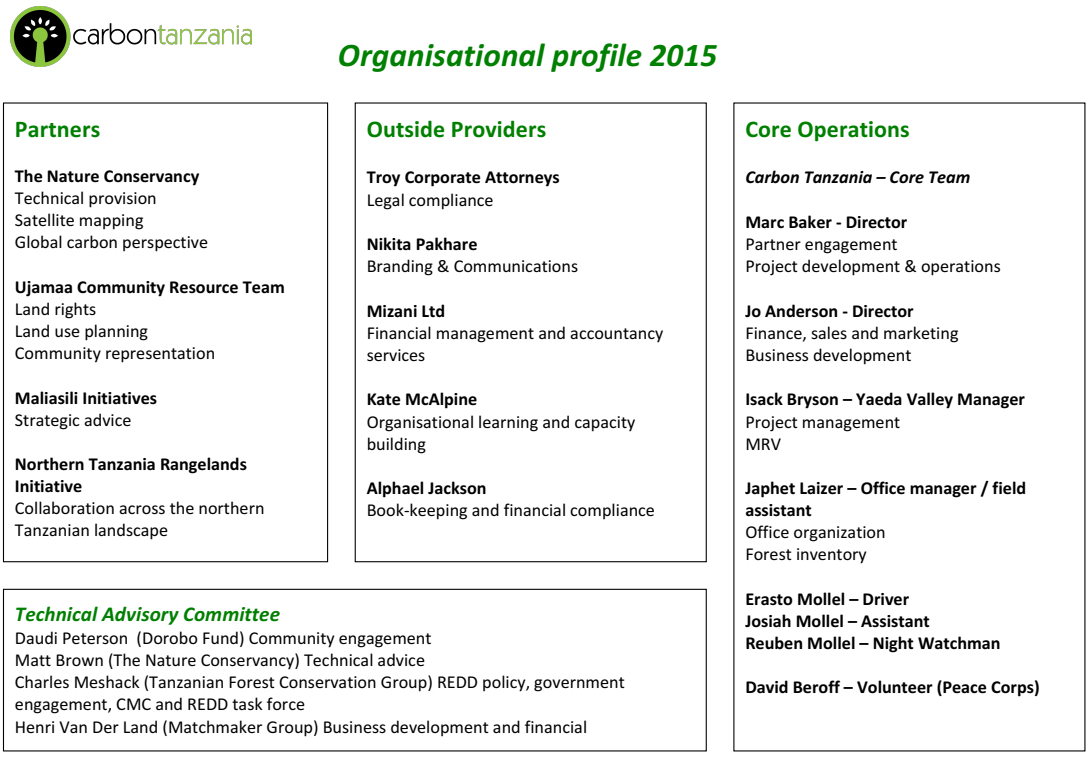
Table 2.4.2. Project participants and activities

Project participants			
Key Function	Organization involved	Type of group / organization	Brief description of activities
Project administration	Carbon Tanzania	Project Developer	- Administrative - Reinvestment - Financial planning - Engagement with government of Tanzania - Market research - Project prospecting - Administer funds
Project technical operations	Carbon Tanzania	Project Coordinator	- Ensure project implementation in accordance with contract and PD - Enter into sales contracts for VCUs - Review field data, track project developments - Serve as key actor in dispute resolution - Develop and monitor project cycle to ensure that it is in accordance with approved methodologies - Manage and support technical demands of project - Increase local capacity where possible
Community engagement / participation	Ujamaa Community Resource Team (UCRT)	Community Partner	- Provide legal counsel to communities for the purpose of securing land tenure and governance and contractual development - Provide knowledge of local context to ensure CT is able to carry out the necessary field operations - Organize meetings with ward and district officials - Serve as key actor in dispute resolution
Forest management / monitoring	WMA	Communities recognized by central government as holding land tenure rights in project area	- Develop and implement RMP - Serve as community guards and patrol, monitor and report on natural resource use in violation of the land use plan - Take action against violators in accordance with Wildlife Act, village by-laws and Village Land Act

2.4.3 Management Team Experience (G4.2)

Marc Baker - CEO
Marc Baker is a director and shareholder of CT Ltd. based in Arusha, Tanzania. He has worked in various capacities in conservation and ecotourism since 1998, including consulting for UNDP-GEF cross border biodiversity project from 1998 to 2000 where he worked in forest management in Tanzania and Kenya. Marc has also worked as a consultant for DANIDA, Care International, and the Wildlife Division of Tanzania on biodiversity assessments, wildlife management, and tourism development. Marc founded Carbon Tanzania in 2008 with the specific aim of driving in-country value-added carbon offsets directly to communities, to ensure both biodiversity protection and a community-based understanding of climate change mitigation and adaptation.

Jo Anderson - CFO
Jo Anderson is a director and shareholder of CT Ltd. based in Arusha, Tanzania. His work has ranged from wildlife surveys in remote areas to assessments of tourism resources in potential development sites. He has worked in the forestry, environment, and tourism industries for 16 years in Tanzania, and has built a network of professional contacts, both in the government and non-governmental sectors. He works in policy development with the relevant Ministries and non-governmental organizations, writing briefing papers and editing technical documents.



2.4.4 Project Management Partnerships/Team Development (G4.2)

Partnerships

Ujamaa Community Resource Team (UCRT) works to empower marginalised people in the rangelands of northern Tanzania, to secure rights to their natural resources and land in order to improve their livelihoods and ability to conserve their resources. UCRT assists the community facilitation for Carbon Tanzania in Makame WMA.

HoneyGuide Foundation (HGF) provides capacity training and support to WMAs to. This includes training for Village Game Scouts, specifically on anti-poaching and data collection using SMART.

Maliasili Initiatives is a non-profit organization that supports the growth, development and performance of leading civil society organizations and social enterprises working to advance sustainable natural resource management practices in Africa. Maliasili Initiatives provides Carbon Tanzania with advice and support around its organizational and business development.

The Nature Conservancy (TNC) is a global conservation organization working to protect ecologically important lands and waters for nature and people. To date, the Conservancy and its more than one million members have been responsible for the protection of more than 15 million acres in the United States and have helped preserve more than 102 million acres in Latin America, the Caribbean, Asia, the Pacific and Africa. TNC provides technical support to Carbon Tanzania.

Team development

Carbon Tanzania conducts annual strategic planning exercises with consultants to ensure roles and accountabilities are under regular revision. This strategic perspectives approach is suitable for small medium enterprises like CT who are constantly dealing with multiple accountabilities.

CT LIMITED

Roles and accountabilities - CT Directors April 2017

	1	2	3	4	5	6
Role	**Project Development**	**Project operations**	**Company Operations**	**Business Strategy**	**Customer Relations**	**Global Relations**
Purpose	Ensure core product and associated co-benefits are being delivered	Ensure ongoing quality and salability of VERs	Ensure compliance with TZ business environment, smooth running of CT core operations	Develop current business practice, explore new opportunities, react to global financial / business changes	Create maintain and nurture relationships with customers	Align CT strategy with evolving global trends / react to shifts in global / national policy affecting CT's business
Overall	MB	MB	JA	JA	JA	MB/JA
Acc 1	Developing projects to certification standards	Collecting and collating project data	Comply with Tanzanian law	Establish and operationalize a global entity	Provide information to support existing customers	Communicate with specific GoT and global agencies about REDD+
Acc 2	Identifying and designing projects reflecting current certification requirements and global agenda	Responding to the needs of community managers and partners	Planning, monitoring and reporting on budget and expenditure	Investigate alternative business models and financial opportunities	Actively identify potential customers and gain new customers	Communicating, educating and informing stakeholders about CT and it's activities
Acc 3		Informing partners on issues arising in project areas	Executing operational finance	Develop business strategy and organizational / HR needs	Maintain and update the Carbon Tanzania brand	Sensing trends within REDD+ project certification systems
Acc 4		Educating and training community members on roles and responsibilities	Invoicing of clients and collection of payment			
Acc 5		Preparing for verification events				
Acc 6		Disperse revenue to communities according to contracts				
Acc 7		Communicating with relevant local government authorities about project activities				

2.4.5 Financial Health of Implementing Organization (G4.3)

Carbon Tanzania has experience marketing REDD+ credits on the global market, and has used this applied experience to form conservative estimates for expected annual credit sales for the Makame Savannah REDD+ Project. Additionally, the Project Proponent's combined REDD+ project development experience have contributed to a detailed financial model for the development and management of the Project. Predicted credit sales and an accurate estimated annual budget demonstrate sufficient cash flow from predicted contracted sales to sustain the project through the end of the crediting period. Carbon Tanzania developed the project through a USAID grant in partnership with other organisations within the Northern Tanzania Rangelands Initiative (NTRI) partnership. Documents supporting these investments can be produced to the project auditor for inspection. Carbon Tanzania has equity investors and a concise business plan and financial modal that are available on request.

The project partners are all well-funded, sufficiently capitalized organizations, and include a major international NGO (The Nature Conservancy), local Tanzanian NGOs with impressive histories of financial sustainability (UCRT, HoneyGuide).

2.4.6 Avoidance of Corruption and Other Unethical Behavior (G4.3)

All forms of bribery and corruption are prohibited. Carbon Tanzania will not tolerate any act of bribery or corruption. Any breach of Carbon Tanzania company policy on corruption and unethical behaviour or local law could result in disciplinary action being taken. A bribe does not actually have to take place - just promising to give a bribe or agreeing to receive one is prohibited.

2.4.7 Commercially Sensitive Information (*Rules* 3.5.13 – 3.5.14)

There is no commercially sensitive information in this project description document, itself. Supporting documents which include commercially sensitive information that will not be made publicly available include: the MOU; Contracts with Buyers and Service Providers; and documents related to project financials.

2.5 Legal Status and Property Rights

2.5.1 Statutory and Customary Property Rights (G5.1)

There is currently no law or policy that specifically mentions the ownership of carbon rights within Tanzania. The new draft forest policy, yet to be enacted, does mention non-wood forest products (NWFP) and their potential; "*Payments for ecosystem services through carbon or watershed protection (PES) will be promoted to strengthen private sector and community investments" (draft National Forest Policy, 2011).* The current Forest Act (2002), which is the act governing forest utilization in Tanzania, clearly states that "*village or community forest reserves confer all ownership and user rights to the village or designated community"*.

The Tanzanian government, with technical and financial assistance from the Royal Government of Norway, has developed a National Framework and Strategy for REDD. This process incorporates a National Climate Change Steering Committee (NCCSC), a National Climate Change Technical Group and a National REDD Taskforce to 'guide the implementation of climate change activities'. A number of Non-Governmental Organizations (NGOs), including Carbon Tanzania, are currently engaged with the government on issues related to carbon rights and how REDD might be implemented in Tanzania.

2.5.2 Recognition of Property Rights (G5.1)

Land tenure in Tanzania is governed by the Land Act No. 4 of 1999, and the Village Land Act No. 5 of 1999. These laws classify all land within the boundaries of registered villages as 'village land,' which is held by the resident communities under customary rights of occupancy held in perpetuity. The Village Land Act designates the village councils and village assemblies as the statutory management authorities over these village lands. This land tenure framework, in combination with Tanzania's local government structures, provides for the rights and responsibilities of the village councils and village assemblies and provides a strong foundation for participatory management of communal land and resources such as forests.

2.5.3 Free, Prior and Informed Consent (G5.2)

The project is being undertaken with full consent of the communities, WMA, local and district government. The project will not involve any property or land held privately. Carbon Tanzania representatives were invited to a board meeting of the Makame WMA AA and a Kiteto District Council meeting where they introduced the concept of the REDD project. Later, consultative meetings were held with both members of the Makame WMA committee and representatives of the five participating villages to explain the respective

responsibilities of each stakeholder in the proposed REDD project. Subsequently meetings with the full Makame WMA board (including village representatives) and executives were held to negotiate the terms of contract, which was thereafter signed by both parties[33]. The contract forms the basis of the REDD project activities. Multiple grassroots led training sessions were conducted[34] which included representatives of both Makame WMA AA and village communities. These training sessions were condcted in the local language (Maa) to sensitise general community members to the aims and requirements of the REDD project. Furthermore, the project aims to follow and reinforce the RMP which is the community generated document that outlines the communities own desires for natural resource management within the WMA.[35]

2.5.4 Property Rights Protection (G5.3)

This project is based on the Makame WMA RMP, a document developed in a participatory manner to ensure that the rights and resources within the project area are protected. This project follows this RMP and therefore aims to protect the rights of the communities within Makame WMA.

2.5.5 Illegal Activity Identification (G5.4)

This project is based on the Makame WMA RMP, a document developed in a participatory manner to ensure that the rights and resources within the project area are protected. The RMP is based on laws governing natural resource use in Tanzania and thus no illegal activity will occur (see 2.5.7.).

2.5.6 Ongoing Disputes (G5.5)

There are no known ongoing disputes or conflicts within the project area.

2.5.7 National and Local Laws (G5.6)

National Sector Policies and WMAs

In the late 1990's, Tanzania went through a complete reform of its natural resource policies to deal with critical management issues facing natural resources. These reforms placed greater emphasis on Community Based Management of Natural Resources (CBNRM). Changes included revisions of the Wildlife Policy (1998), the Environment Policy (1997), the Forest Policy (1999), the Tourism Policy (1999), and Beekeeping Policy (1998). Note that the common thread in all of these revisions is: (a) to utilize natural resources efficiently and sustainably, (b), to include local communities in the process, and (c) to increase benefits accruing to local communities. All this adds up to a much stronger people orientation in natural resource management policies and sets the stage for the creation of Wildlife Management Areas (WMAs) and the basis for developing a Resource Management Plan (otherwise know as Resource Management Plan - RMP). Besides the national policy context, the RMP is embedded in the framework of the national development vision, which amongst other things, aspires to graduate Tanzania from a least developed country to a middle-income country by 2025. This development vision aims to promote 'high quality livelihoods, through sustainable and shared growth, free from poverty and gender inequalities, political stability, with leaders and public servants held accountable through good governance, and a strong competitive economy.' The economic benefits to communities from managing WMAs as a means of generating revenue for local development is supported by this vision.

In order to implement the Wildlife Policy (1998), the Tanzanian Government developed and approved several strategies including development and approval of the Wildlife Conservation (Wildlife Management Areas) Regulations in 2012. The WMA Act (2012) aims to guarantee sustainable conservation of wildlife resources in local community lands and safeguard the interests of traditional communities, the Wildlife

[33] See appendix for contract
[34] Ibid
[35] Ibid

Conservation (Wildlife Management Areas) Regulations 2012 calls for the development of a Resource Management Plan (RMP) of a WMA. The RMP, updated in 2017 for this REDD project is a result of the workshops organised by the AA and review workshops to accord the RMP with Wildlife Conservation Act no. 5 of 2009. The RMP is a document that sets the basic management and development philosophy of MWMA, provides the current image of reality, defines the desired future of the MWMA and provides for the means of changing the negative situation and achieving the desired future over a period of 5 years (2017-2022).

Local Government Policy
The Local Government Act of 1982, empowers District Councils to implement economic activities and ensure economic growth and development in a District. Responsibility is delegated to the Village Government, as the grassroots organ. People must be involved in planning, decision making, implementation and M&E, on all matters pertaining to development. WMAs conform well to this policy, and MWMA is charged with local development responsibility on behalf of the members.

Benefit Sharing
Once User Rights are obtained, the RMP assumes that the AA will enter into agreements for the specified commercial operations of the WMA, subject to approval by the Director of Wildlife. Anticipated is that the Director shall collect normal fees for such operations as pertains to Hunting Block Fees, Permit Fees, Conservation Fees, Trophy Fees, Trophy Handling Fees, photographic tourism, etc. (as in the Tourist Hunting Regulations, 2010). The 1995 Management Plan for Tourism Hunting suggested a scheme whereby 50% of revenues go back to the community for development projects.

MWMA Benefit Sharing Guidelines
In line with the MWMA Constitution of 2017 the following guidelines shall prevail: The benefit sharing from a WMA shall comply with mechanisms of equitable distribution of costs and benefits, distributed equally for the benefit of Village Members irrespective of size of land or population. Targeted shall be economic development and poverty reduction.

2.5.8 Approvals (G5.7)

See MoU Appendix
See Contract Appendix

2.5.9 Project Ownership (G5.8)

2.5.10 1.1.1 Project Ownership (G5.8)

The Wildlife Policy of Tanzania was adopted in 1998. The policy provides the framework for the establishment of a new category of protected area: the Wildlife Management Area (WMA), for the purposes of effecting community-based conservation. The policy aims at involving rural communities and other stakeholders in taking joint responsibility for the sustainable management of wildlife and other natural resources. In order to support the implementation of the Wildlife Policy (1998), the Government developed and approved the Wildlife Conservation (Wildlife Management Areas) Regulations in 2002. The Wildlife Conservation (Wildlife Management Areas) Regulations, updated in 2012, provide the legal framework that shall apply to village land set aside for this REDD project.

The Guidelines were intended to serve as practical tools for the establishment and management of Wildlife Management Areas (WMAs). In order to guarantee sustainable conservation of wildlife resources in WMAs, and safeguard the interests of traditional communities, the Wildlife Conservation (Wildlife Management Areas) Regulations 2002 call for the development of a Resources Management Zone Plan (RMP) which is the guiding document of the WMA. This resource plan was first completed in 2009 and then updated in 2017 during the development of this REDD project. The updates made to the resource plan ensure that 'carbon in woodlands' is included as a recognized use of resources and REDD is included as a resource value mechanism recognized by the WMA. Under the new resource plan, REDD is listed as

a permitted resource use within the project area. The land within the WMA is communally owned by the villages within the WMA under the *Village Land Act No.5 Section B of 1999* and the guidelines for Participatory Village land Use management in Tanzania 1998 (Updated 2013) and regulations for Establishment of Wildlife Management areas in Tanzania 2005. Each village has an associated land use plan which matches the resource plan of the WMA ensuring both the land and the resources are owned and managed by the WMA.

The Makame Savannah REDD Project has a project start date of April 27th, 2016. On this day, the Memorandum of Understanding (see appendix) between Carbon Tanzania, the Makame Wildlife Management Area Authorized Association, and the Kiteto District was signed leading to the start of project activities aimed at protecting and conserving natural resources including. Carbon Tanzania then signed a contract with Makame WMA on 27th May 2017 (see appendix). This contract is made under the Wildlife Act number 5 (2009), the Wildlife Management Area (WMA) Act of 2012, Village Land Act number 5 (1999) and the Contract Act of 2002. This contract is linked to the WMA following its own Resource Management Plan, the contract is for a period of 30 years, outlines the areas of responsibility for the WMA and Carbon Tanzania and ensures that the carbon generated by this project is the sole property of Carbon Tanzania.

2.5.11 Management of Double Counting Risk (G5.9)

The project has not nor does it intend to create non-VCS/CCB GHG emission reductions or any another form of environmental credit under any other program.

2.5.12 Emissions Trading Programs and Other Binding Limits

No emission reductions generated by the project are part of an emissions trading program. Further, Tanzania does not currently have a national, legally binding limit on greenhouse gas (GHG) emissions nor is there currently a compliance emissions trading program which accepts REDD credits.

2.5.13 Other Forms of Environmental Credit

As described above, the project has not nor does it intend to create non-VCS/CCB GHG emission reductions or any another form of environmental credit. This includes, but is not limited to, biodiversity credits, species banking, water certificates, and nutrient certificates.[36]

2.5.14 Participation under Other GHG Programs

The Makame Savannah REDD Project has not been registered, nor is it seeking registration under any other GHG programs other than VCS and CCB.

2.5.15 Projects Rejected by Other GHG Programs

The project has neither submitted to nor been rejected from any other greenhouse gas program.

2.5.16 Double Counting (G5.9)

As of August 2017, Tanzania is not participating in any national REDD markets where a compliance mechanism could lead to double counting. Double counting would therefore be limited to the voluntary markets. As mentioned above the Makame Savannah REDD Project has not been registered, nor is seeking registration, under any other GHG programs hence double counting is not an issue for this project.

[36] Forest Trends, “Our Initiatives,” http://www.forest-trends.org/#

3 CLIMATE

3.1 Application of Methodology

3.1.1 Title and Reference of Methodology

The Makame Savannah REDD project is utilizing the Avoided Deforestation Partners' VCS REDD Methodology, entitled, "VM0007: REDD Methodology Modules (REDD-MF)." The only eligible activity as part of this project is avoiding unplanned deforestation, hence only modules related to unplanned deforestation are required. This project is eligible as an avoiding unplanned deforestation project because the forest land is expected to be converted to non-forest land in the baseline case and the land is not legally authorized and documented to be converted to non-forest or a managed tree plantation. The specific modules applied to the project are listed below.

REDD-MF, REDD Methodology Framework Version 1.5

Carbon Pool Modules:

CP-AB, "VMD0001 Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools," Version 1.1

CP-D, "VMD0002 Estimation of carbon stocks in the dead-wood pool," Version 1.0

Baseline Modules:

BL-UP, "VMD0007 Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation," Version 3.2

Leakage Modules:

LK-ASU, "VMD0010 Estimation of emissions from activity shifting for avoided unplanned deforestation," Version 1.1

Monitoring Module:

M-MON, "VMD0015 Methods for monitoring of greenhouse gas emissions and removals," Version 2.1,

Miscellaneous Modules:

X –STR, "VMD0016 Methods for stratification of the project area," Version 1.1

X-UNC, "VMD0017 Estimation of uncertainty for REDD project activities," Version 2.1

Tools:

T-SIG, CDM tool "Tool for testing significance of GHG emissions in A/R CDM project activities," Version 1.0

T-ADD, "VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities," Version 3.0

T-BAR, "Tool for AFOLU non-permanence risk analysis and buffer determination," Version 3.3

Use of modules, REDD-MF, M-MON, T-ADD, T-BAR, X-UNC, and X–STR, is always mandatory when using the VM0007 methodology. Further use of modules, BL-UP and LK-ASU, is mandatory in the case of projects focusing on unplanned deforestation. Use of the module T-SIG determines whether GHG emissions by sources and/or decreases in carbon pools are insignificant. Finally, CP-AB is mandatory in all cases and while CP-D is optional as the dead wood pool is greater in the project scenario than the baseline scenario, it has been included.

3.1.2 Applicability of Methodology

The above modules are applicable as demonstrated below.

REDD-MF, REDD Methodology Framework

Table 3.1. Applicability Conditions and Demonstration for the REDD Methodology Framework Module.

Applicability Condition	Demonstration
Land in the project area has qualified as forest at least 10 years before the project start date.	The project area complies with this condition with complete forest cover demonstrated for the year 2005 as demonstrated by the imagery classification used for development of the baseline.
If land within the project area is peatland and emissions from the soil carbon pool are deemed significant, the relevant WRC modules (see Table 1) must be applied alongside other relevant modules.	No lands within the project area is classified as a peatland.
Baseline deforestation and baseline forest degradation in the project area fall within one or more of the following categories: Unplanned deforestation (VCS category AUDD); Planned deforestation (VCS category APD); Degradation through extraction of wood for fuel (fuelwood and charcoal production) (VCS category AUDD).	Baseline deforestation in the project area falls within the unplanned deforestation category, as the agents of deforestation are small scale farmers who do not have permission to convert forest in the project area to cropland.
Leakage avoidance activities must not include: • Agricultural lands that are flooded to increase production (e.g., paddy rice); • Intensifying livestock production through use of feed-lots6 and/or manure lagoons.	Leakage avoidance activities do not include flooding agricultural land or creating feed-lots or manure lagoons.
All land areas registered under the CDM or under any other carbon trading scheme (both voluntary and compliance-orientated) must be transparently reported and excluded from the project area. The exclusion of land in the project area from any other carbon trading scheme shall be monitored over time and reported in the monitoring reports.	The Makame Savannah REDD project is not registered in any carbon trading scheme or program.

BL-UP, "VMD0007 Estimation of Baseline Carbon Stock Changes and Greenhouse Gas Emissions from Unplanned Deforestation"

Table 3.2. Applicability Conditions and Justifications for the VMD0007 Module.

Applicability Condition	Justification
Baseline agents of deforestation shall: (i) clear the land for settlements, crop production (agriculturalist) or ranching, where such clearing for crop production or ranching does not amount to large scale industrial agriculture activities; (ii) have no documented and uncontested legal right to deforest the land for these purposes; and (iii) are either resident in the reference region or immigrants. Under any other condition this framework shall not be used.	The baseline agents of deforestation clear the land for cropland. These small-scale farmers have no legal right to use or deforest the land. These agents of deforestation are from nearby communities and in some cases immigrant actors looking for land to convert for agricultural uses.

Where, pre-project, unsustainable fuelwood collection is occurring within the project boundaries modules BL-DFW and LK-DFW shall be used to determine potential leakage.	There is no shortage of fuelwood in the area surrounding the project area. As such, it is unlikely that fuelwood is collected from the project area and fuelwood is much more likely to be collected in areas closer to where communities live rather than in the project area.

M-MON, "VMD0015 Methods for Monitoring of Greenhouse Gas Emissions and Removals"

Table 3.3. Applicability Conditions and Justifications for the VMD0015 Module.

Applicability Condition	Justification
Emissions from logging may be omitted if it can be demonstrated the emissions are de minimis using T-SIG.	Logging emissions have been omitted as no commercial timber harvest occurs in the baseline or with project case.
If emissions from logging are not omitted as de minimis, logging may only take place within forest management areas that possess and maintain a Forest Stewardship Council (FSC) certificate for the years when the selective logging occurs.	Not applicable
Logging operations may only conduct selective logging that maintains a land cover that meets the definition of forest within the project boundary.	Not applicable
All trees cut for timber extraction during logging operations must have a DBH greater than 30 cm.	Not applicable
During logging operations, only the bole/log of the felled tree may be removed. The top/crown of the tree must remain within the forested area.	Not applicable
The logging practices cannot include the piling and/or burning of logging slash	Not applicable
Volume of timber harvested must be measured and monitored.	Not applicable

3.1.3 Project Boundary

Sources of GHG Emissions Associated with the Baseline, Project and Leakage

GHG emission sources included in the project boundary are listed in Table 3.4. Justifications are provided when excluded from the project boundaries.

Table 3.4. GHG Emission Sources Included in the Project Boundary.

Source	Gas	Included	Justification/ Explanation
Biomass burning	CO_2	No	CO_2 emissions are already considered in carbon stock changes.
	CH_4	Yes	While CH_4 and N_2O emissions are conservatively excluded in the baseline, they are included in the with project case where fires occur.
	N_2O	Yes	

Fossil Fuel Combustion	CO_2	No	Emissions from fossil fuel combustion in the baseline and project case are minimal. As per methodology module E-FCC "Fossil fuel combustion in all situations is an optional emission source."
	CH_4	No	Emissions are small and negligible.
	N_2O	No	
Use of fertilizers	CO_2	No	Excluded. No increase in fertilizer use is contemplated in the project case as part of leakage mitigation or any other activity.
	CH_4	No	
	N_2O	No	Excluded. No increase in fertilizer use is contemplated in the project case as part of leakage mitigation or any other activity.

Carbon Stock Associated with the Baseline, Project and Leakage

This project will include the following carbon pools (see Table 3.5).

Table 3.5. Carbon Pools Included in the Project Boundary.

Carbon pools	**Included / Excluded**	**Justification / Explanation of Choice**
Aboveground	Included	Mandatory to include. Wood biomass is included, which is the most significant pool.
Belowground	Included	Included and treated together with aboveground biomass for completeness to include whole tree (aboveground and belowground) biomass.
Dead Wood	Included	The standing dead wood pool was included as it can represent a significant component of forest biomass. Lying dead wood has been excluded as this pool in inconsequential in this termite prevalent ecosystem.
Harvested Wood Products	Excluded	Excluded as no commercial harvesting for wood products takes place in the baseline (as part of the forest conversion process) or with project scenarios.
Litter	Excluded	Conservatively omitted, as allowed by methodology.
Soil Organic Carbon	Excluded	Conservatively omitted, as allowed by methodology.
1. As noted in the table above, this project will consider three pools of carbon and the applicable modules include: CP-AB "VMD0001 Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools" and CP-D, "VMD0002 Estimation of carbon stocks in the dead-wood pool".		

See section 3.2, below, for a map of the project region including the project area, leakage belt, RRD and RRL.

3.1.4 Baseline Scenario

The steps described below are in accordance with the "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities", ver. 3.0.

Step 1. Identification of alternative land use scenarios to the proposed VCS AFOLU project activity

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

Credible alternative land use scenarios considered include:

Alternative 1: The without-project scenario involves lack of implementation of the WMA Resource Management Plan (WMA RMP). With tenure, boundaries and land-use continuing to be poorly-defined in the baseline without-project scenario, project area lands continue to be at risk of intrusion by outsiders and conversion of forest to agriculture. Note this is equivalent to continuation of the pre-project land-use.

Alternative 2: The WMA RMP is implemented and village land tenure and resource rights are established and maintained, and forest cover effectively conserved, without the activity being registered as a VCS AFOLU project.

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations.

The scenarios outlined above are consistent with enforced mandatory applicable laws and regulations. WMAs are created with the approval of the district governments and are given formal legal designation through the national Wildlife Conservation Act of 2009 and governed by WMA regulations enacted in 2012. However, no national or district government funds are made available for the management of WMAs, nor are there any finance requirements imposed on the management of WMAs.

Sub-step 1c. Selection of the baseline scenario

As per the VCS Additionality tool (VT0001), the baseline scenario is selected and justified applying the methodology, module BL-UP, detailed in Section 3.1.4, and corresponds to Alternative 1 above.

3.1.5 Additionality

Step 2*. Investment analysis*

Sub-step 2a. Determine appropriate analysis method

The project activity is characterized as implementation of the WMA RMP. Despite hunting-related payments received from 2011-2016, there was a significant shortfall between the required operational expenses and hunting-related revenue (NTRI 2017, IRG 2016). It is further anticipated that, in the absence of adequate implementation of the WMA RMP, involving anti-poaching and habitat protection measures, it can be expected that hunting contracts, currently administered as one-year renewable contracts with the WMA, will not be renewed, due to a degrading resource base (with lower abundance and diversity of game species), and hunting revenue will drop to zero. Consequently, in the absence of VCS-related income, it is expected that the project activity will generate no revenue, and therefore the simple cost analysis is the appropriate method to demonstrate that the project activity is financially less attractive than alternatives.

Sub-step 2b. Option 1 – Simple cost analysis

Annual Makame WMA operational expenditures (both planned and actual), covering governance and administration as well as protection and management, for the 2014/2015 and 2015/2016 years are

detailed in the table below. Anticipated operational expenditures, with full implementation of the project activity, are expected to be similar to or more than the "planned" budget figures below.

Table 3.6. Annual Makame WMA operational expenditures.

	2014/2015		2015/2016	
	planned	*actual*	*planned*	*actual*
Costs	**US$**	**US$**	**US$**	**US$**
Salary and Allowance for Guards	$6,624	$3,441	$6,445	$2,953
Community Equipment	$5,704	$2,196	$1,710	$1,213
Travel	$1,380	$3,276	$4,464	$4,140
Meetings	$14,635	$8,689	$11,700	$4,696
Building	$10,080	$3,534	$4,680	$657
Manager	$184	$320	$194	$552
Audit of village development projects		$610	$1,125	$360
Village Game Scout Allowance	$4,140	$3,143	$2,700	$2,106
Other Costs	$932	$932		$5,730
Oil/petrol	$1,656	$235	$1,350	
Transportation equipment	$460	$262		
Equipment (3 Guns) Masai plate	$3,110	$3,110		
Patrols	$34,889		$20,621	
Education	$20,193		$13,748	
Fees	$3,864	$13	$2,851	$1,282
TOTAL	**$107,851**	**$29,761**	**$71,588**	**$23,689**

Budget expenditures for the Makame WMA, in the absence of carbon revenue, are far below what is needed for the effective protection and management of the area. Actual expenditures ranged from 28% to 33% of planned expenditures for the 2014-2016 period (analysis above, Makame WMA accounting data). A "low end" estimate of required annual expenditure of US$138,479 (IRG 2016) far exceeds actual annual expenditures for 2014-2016 of ~US$20-30,000 (IRG 2016, Makame WMA accounting data). As stated, the US$138,479 suggested budget is a low-end estimate - effective anti-poaching efforts at the Enduiment WMA cost the equivalent of $175/km^2 (NTRI 2017), which would put the corresponding Makame WMA budget requirement at approximately US$650,000. Not surprisingly, with so little financing available, most (>90%) of Makame WMA expenditures currently go to core governance and administrative costs, and the remainder of only 8.8% is spent on resource management and protection (IRG 2016), imposing a further constraint on implementation of the WMA RMP.

USAID, through the Endangered Ecosystems of Northern Tanzania (EENT) project, implemented by the Northern Tanzania Rangelands Initiative (NTRI), has provided funding to support organizations, including Carbon Tanzania, and direct funding for the development of the WMA RMP and a WMA business plan, but provides no direct financing to the WMA Authorized Association responsible for implementing the WMA RMP. Furthermore, the EENT project is scheduled to end in 2019, which will substantially reduce external support to the WMA.

Makame is uniquely dis-advantaged due to its remoteness and difficulty of access, and poor potential for photographic tourism; photo-tourism is a key determining factor in the few "strongly financially viable" WMAs in northern Tanzania. Makame currently has no accommodation infrastructure to facilitate tourism. While the Makame WMA currently generates some revenue from hunting tourism, it is far below the amount needed to achieve effective resource protection and effectively carry out the project REDD activity. Compare annual hunting revenue from 2014-2016 destined for management of the WMA of ~US$20-30,000 (Makame WMA accounting data), to the estimated required annual budget of US$138,479; current

revenue sources provide, liberally, less than a quarter of required financing[37]. And as explained above, hunting revenue is expected to be zero without effective management and protection measures in place.

Result Step 2: As demonstrated above, the project without the financial benefits of VCS-related carbon payments is not financially competitive with reasonable alternative economic activities.

Step 4 – Common Practice

The project activity, Alternative 2, involving sufficient financing and effective implementation of a WMA RMP, is not common practice. The clearly-demonstrated financial challenges of Makame are not peculiar to WMAs in Tanzania. Most WMAs are not earning sufficient revenue to cover costs (NTRI 2017[38], IRG 2016[39], TetraTech ARD 2013[40]). A 2013 evaluation (TetraTech ARD) found that

> "… costs required to establish and operate WMAs are high, and that most WMAs are not yet financially self-sustaining. The evaluators observed that WMAs which are not able to cover their operational costs are often brought to a standstill in terms of patrolling and conservation work, since no clear sources of external support exist."

Similarly, a recent evaluation of the financial viability of WMAs in Tanzania (IRG 2016) assessed more than half of those WMAs evaluated as "marginally viable" or "non-viable."

Thus, a WMA with sufficient financing for effective management and protection, in the absence of carbon revenue (or other as yet to be developed alternative revenue sources), cannot be characterized as common practice.

Results of the Additionality Analysis

As demonstrated above, the project activity, without revenue from carbon credits, faces severe financial constraints, and is not a common practice in the region. Therefore, the project is determined to be additional.

3.1.6 Methodology Deviations

The following deviations to the methodology are applied.

The similarities of the project boundaries were assessed using population density rather than settlement density. This methodological deviation is warranted due to inconsistencies in the available data on the location of settlements within Tanzania. Use of population density data still meets the intent of the methodology as both population and settlement density reflect the relative density of resident populations (and level of pressures associated with those populations).

The parameter TOTFOR has not been "limited to forest areas within 5km of roads and rivers suitable for conversion to agriculture / livestock" as specified in the methodology, for lack of relevant data on suitability. As the resulting TOTFOR value is greater, the AVFOR value is also greater. The PROPLB parameter is therefore smaller thus resulting in more leakage outside the leakage belt and hence a conservative estimate. This deviation results in conservative accounting of leakage outside the leakage belt.

The parameter COLB has not been "limited to areas demonstrated to be suitable for agriculture or livestock ranching" as specified in the methodology, for lack of relevant data on suitability. COLB has conservatively

[37] The NTRI 2017 report estimates that revenue covers only 5% of needed expenses

[38] Northern Tanzania Rangelands Initiative. 2017. Making Wildlife Management Areas Deliver for Conservation and Communities.

[39] IRG. 2016. Analysis of WMA Financial Viability and Options Study. Produced under USAID Contract No. AID-621-TO-15-00004, Promoting Tanzania's Environment, Conservation and Tourism (PROTECT)

[40] Tetra Tech ARD and Maliasili Initiatives. 2013. Tanzania Wildlife Management Areas Evaluation Final Evaluation Report.

been set to the average aboveground tree carbon stock for forests, woodlands, and bushlands rather than the area-weighted average aboveground tree carbon stock. This deviation results in conservative accounting of leakage outside the leakage belt because the area weighted average value is less than the average value.

Parameter $U_{P,SS,i,pool\#}$ will be monitored at least once every 10 years, on re-measurement of forest carbon stocks. While module X-UNC requires that monitoring of this parameter occur every ≤ 5 years, this requirement is inconsistent with the VM0007 pools modules, which specify that stock estimates (from which uncertainty is calculated) are assumed valid for 10 years. Therefore, a deviation to module X-UNC is applied to permit parameter $U_{P,SS,i,pool\#}$ to be monitored every ≤ 10 years, putting it into alignment with modules CP-AB and CP-D.

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

Development of the project baseline emissions from unplanned deforestation, both rate and location, was conducted in conformance with the VCS modular REDD methodology VM0007, specifically the BL-UP module using the simple historic approach. The project meets the applicability conditions of this module as set out in Section 3.1.2.

Definition of Boundaries

Project boundaries for the development of the baseline include spatial and temporal boundaries from which information on the historical rate of deforestation is extracted and projected into the future. The rate of deforestation is derived from the reference region for rate, while the reference region for location is used in the spatial modelling component of the baseline. Finally, the leakage belt is the area surrounding the project area, where activity shifting leakage (i.e., deforestation which is displaced from the project area due to implementation of the project activities) is most likely to occur.

Spatial Boundaries

Reference Region for Projecting Deforestation Rate

The reference region for rate of deforestation (RRD) has a total area of 5,011,230 ha hectares[41] and is delineated as shown in Figure 3.1. It excludes the project area and leakage belt, and all non-forested areas at the start of the historical reference period in the year 2005. Further, the reference region has been defined with knowledge of the drivers of unplanned deforestation in the region.

A guiding principle in the delineation of the reference region was, to the extent possible within the requirements of the VM0007 methodology, to reflect political boundaries (districts), to facilitate any eventual alignment with an anticipated Government of Tanzania jurisdictional REDD framework.

The main agents of deforestation in the RRD are small scale farmers who intend on establishing croplands through conversion of forest land. The proportion of agriculturalist to ranchers is the same in the RRD as is expected in the project area in the baseline case[42]. Landscape factors (i.e., soil type, vegetation type, elevation, and slope) do not drive agricultural decisions for small scale farmers (see Table 3.7).

Maps of the landscape factors, including forest type, soil type, slope, and elevation that were used to help define the reference region and ensure similarity to the project area can be found in the project database. Incorporation of these landscape factors had little effect on delineating the RRD as almost all land in the RRD is suitable for conversion to agricultural land.

Land tenure was also used to help delineate the RRD. Specifically, national parks, forest reserves, and game reserve were excluded from the RRD as these areas differ from the privately-owned project area. Comparison of the area covered by landscape factors, transportation networks and human infrastructure are detailed in the Table 3.7 below.

[41] The area of the RRD is larger than the minimum required (MREF). The MREF was calculated to be 240,023 ha.
[42] ibid

Table 3.7. Criteria for defining the boundary of the RRD and leakage belt.

Factors Assessed	Category	Project Area	Leakage Belt	Reference Region for Location, RRL	Reference Region for Rate, RRD
Vegetation (%)					
	Bushland	17.3%	13.5%	40.0%	39.9%
	Grassland	6.2%	3.8%	18.3%	17.7%
	Natural Forest	0.0%	0.0%	0.3%	1.1%
	Other	1.9%	2.1%	6.6%	5.1%
	Woodland	74.6%	80.6%	34.8%	36.2%
Elevation (%)					
	0-500	0.0%	0.0%	0.0%	0.0%
	500-1000	0.0%	0.0%	11.4%	23.7%
	1000-1500	100.0%	99.7%	81.9%	67.6%
	1500-2000	0.0%	0.3%	6.6%	8.7%
Slope (%)					
	Gentle (<15%)	99.3%	98.5%	94.8%	90.1%
	Steep (>15%)	0.7%	1.5%	5.1%	9.9%
	Blank	0.0%	0.0%	0.0%	0.0%
Soil (%)					
	Chernozems	0.0%	0.0%	0.7%	0.2%
	Chromic Cambisol	0.0%	0.0%	0.0%	0.2%
	Chromic Luvisols	92.6%	92.6%	74.8%	59.1%
	Eutric Fluvisols	0.0%	0.0%	0.0%	0.0%
	Eutric Leptosols	0.0%	0.0%	2.4%	2.5%
	Eutric Planosols	0.0%	0.0%	0.0%	1.9%
	Eutric Vertisols	7.4%	7.4%	3.7%	2.1%
	Ferralic Cambiso	0.0%	0.0%	5.8%	17.0%
	Gleyic Soilonetx	0.0%	0.0%	1.0%	1.2%
	Haplic Luvisols	0.0%	0.0%	0.5%	3.8%
	Haplic Nitisols	0.0%	0.0%	0.0%	0.0%
	Haplic Phaeozems	0.0%	0.0%	4.1%	3.3%
	Haplic Solonetz	0.0%	0.0%	0.0%	0.7%
	Lithic Leptosols	0.0%	0.0%	6.4%	2.7%
	Luvic Phaeozems	0.0%	0.0%	0.0%	2.2%
	Rhodic Ferrasols	0.0%	0.0%	0.0%	1.5%
	Sodic Solonochak	0.0%	0.0%	0.6%	0.4%
	Umbric Nitisols	0.0%	0.0%	0.0%	1.1%
	Blank	0.0%	0.0%	0.0%	0.2%
Rivers (m/km^2)					
		0	0	0	0
Roads (m/km^2)					
		185	164	84	66
Settlements/Population (Number of persons/km^2)					
		3.45	3.94	19.46	30.51

Reference Region for Projecting Location of Deforestation

The reference region for projecting location of deforestation (RRL) is delineated as shown in Figure 3.1. The entire RRL is located within the outer perimeter of the RRD and has an area of 4,199,540 hectares. In agreement with the methodology, it is a single parcel, contiguous with and including the project area and the leakage belt. Further, it is 26% non-forest and 74% forest and thus in compliance with the methodological requirements of a minimum of 5% non-forest and a minimum of 50% forest. The area of the RRL totals 4,199,540 ha which is within the ±25% of the size of the RRD. As the primary driver of deforestation is subsistence and small-scale farming, access to and availability of land are the most important factors when determining if land is suitable for conversion. Neither, soil suitability, precipitation, elevation, or access to markets play a significant role in the deforestation agent's decision on where to settle and convert land. Conservation lands[43] where the protected status is enforced has been removed from the RRL. Further, lands with elevation greater than 1800 m or less than 800 m have been removed from the RRL to ensure the RRL is similar to the project area. Finally, wards were the population density is greater than 0-5 persons/ha have been removed as there urban and semi-urban areas are not reflective of the project area.

[43] Conservation lands removed include national parks, forest reserves, and game reserves.

Figure 3.1. Reference Region for Rate (RRD) and Reference Region for Location (RRL).

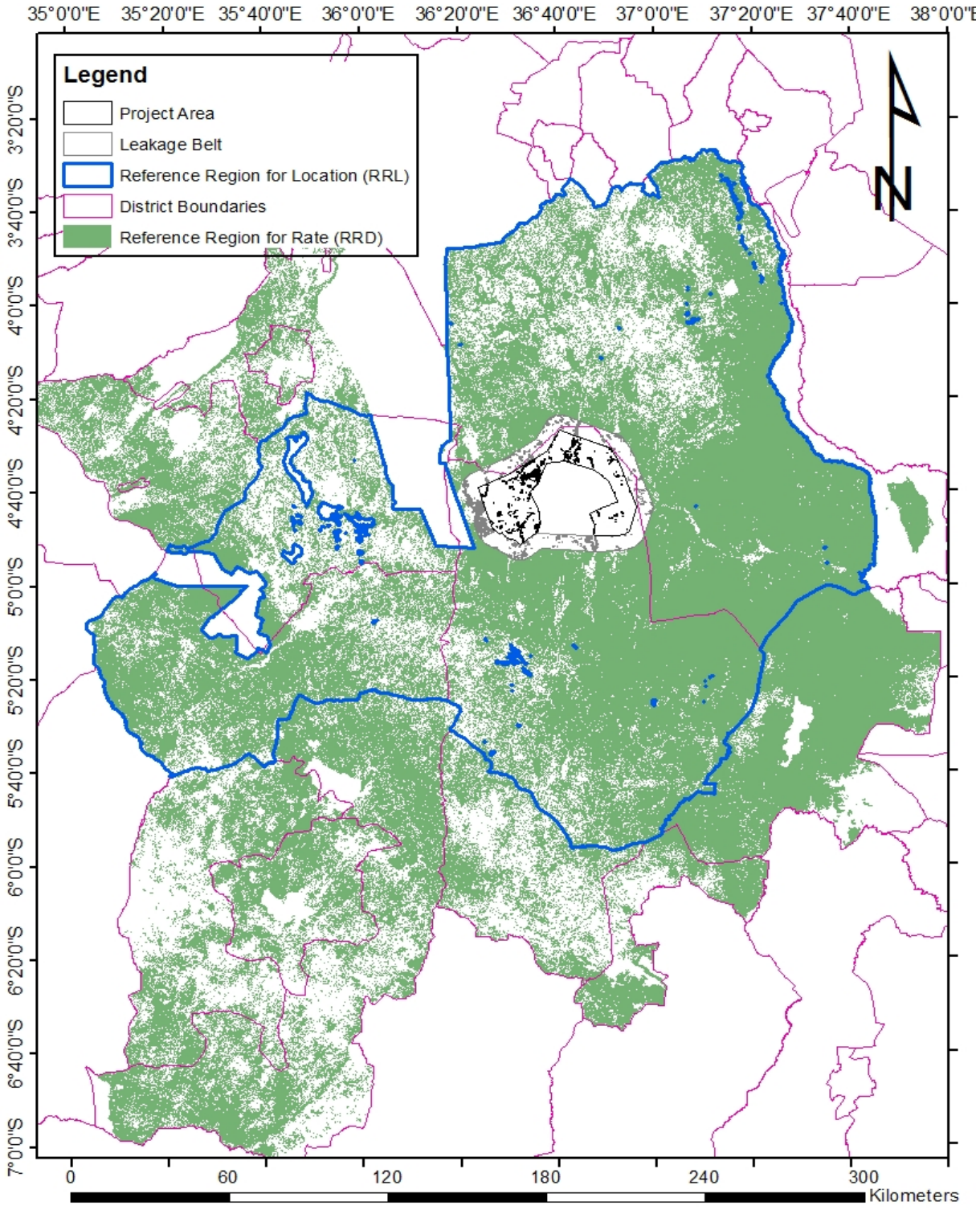
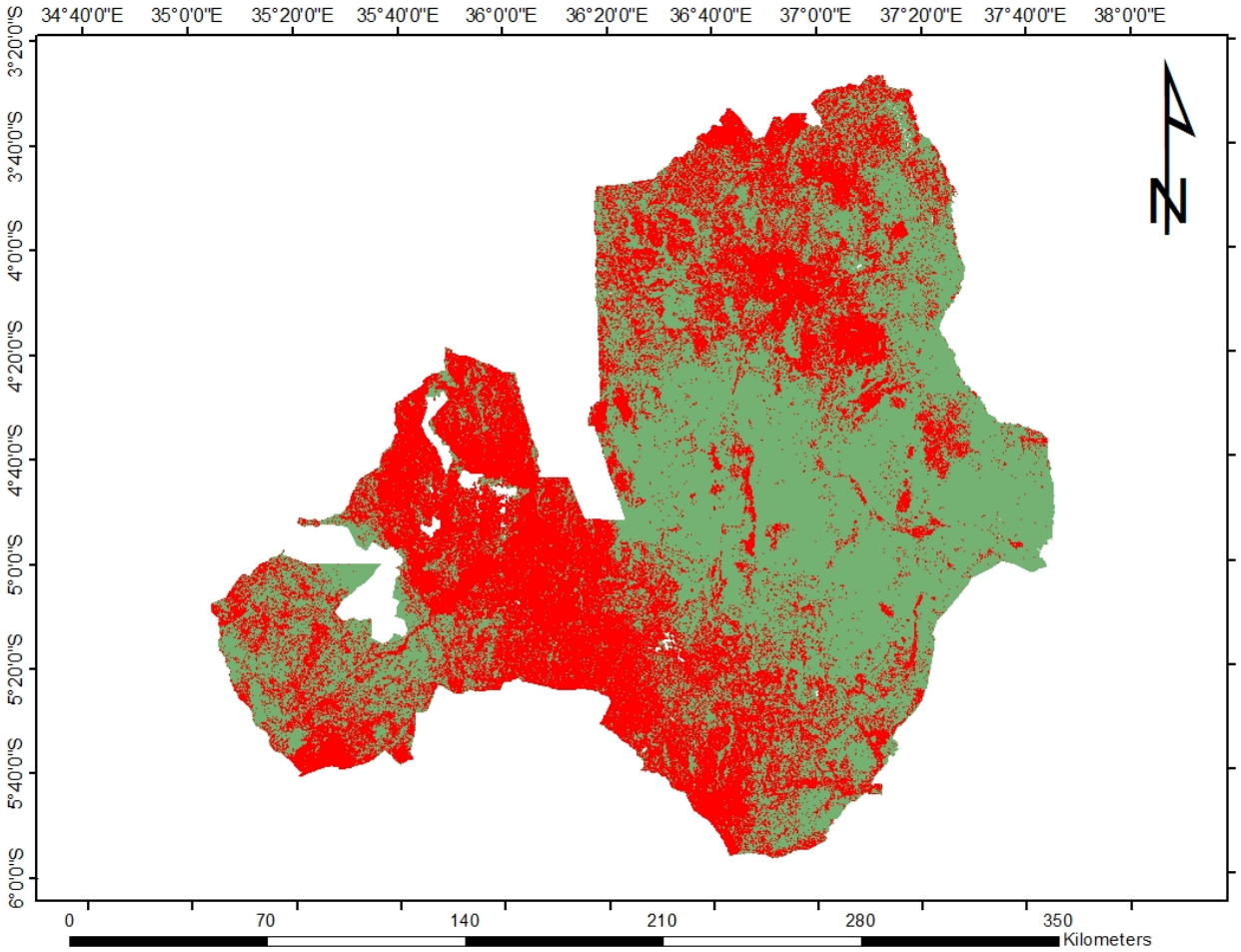


Figure 3.2. 2015 forest/non-forest map, with the non-forest class is in red.



Project Area

The project area (see Figure 3.3, below) consists of one contiguous parcel of land near the northern Kiteto District boundary in north east Tanzania which is under threat of deforestation. The project proponents are undertaking project activities in and around the project area to mitigate deforestation pressures and stop deforestation. The total project area is 104,065 hectares and was 100% forested at the start of the project. The project areas boundaries were delineated and georeferenced as part of the establishment of the WMA.

Leakage Belt

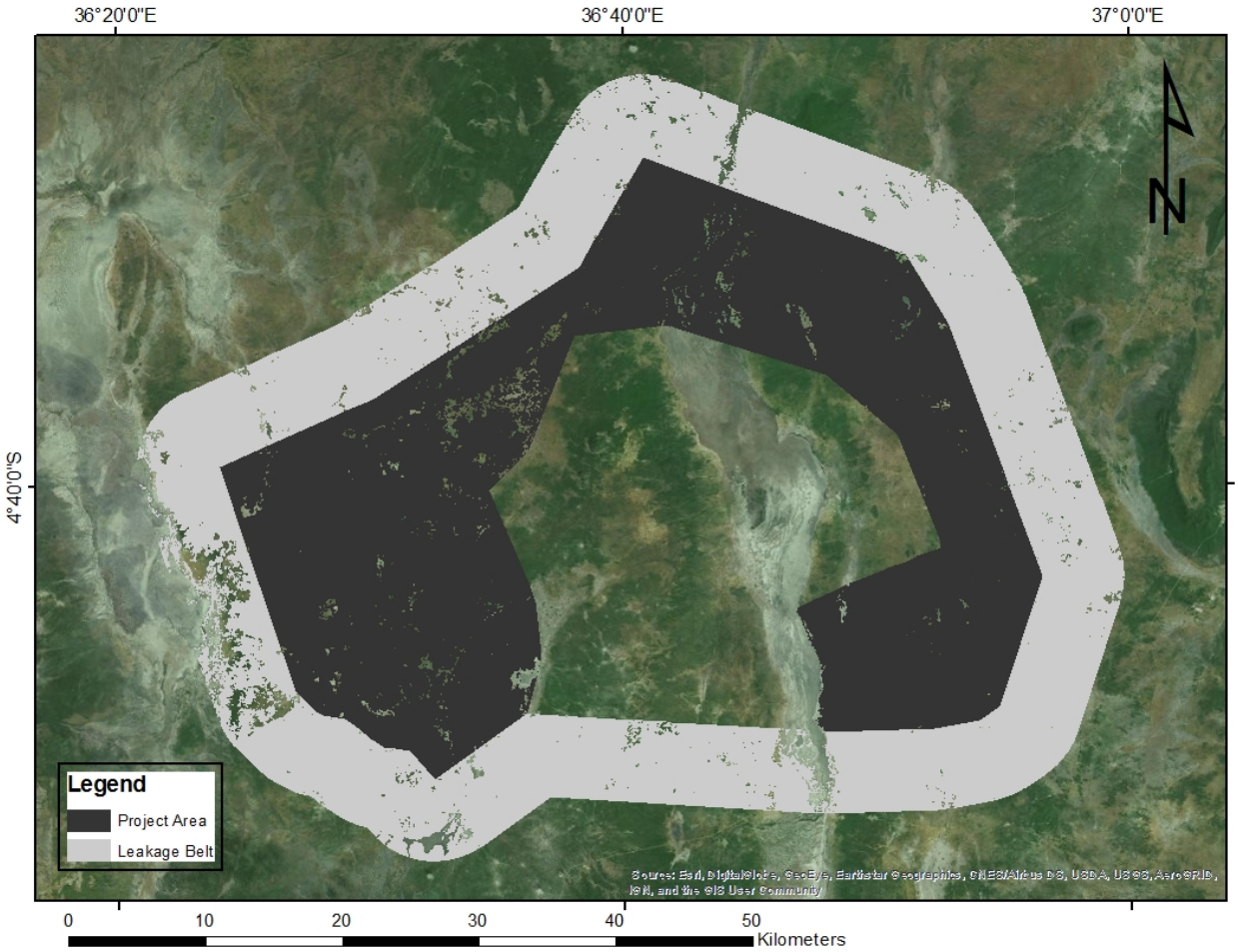
The leakage belt (see Figure 3.3, below) is the area surrounding or in the immediate vicinity of the project area where leakage caused by activity displacement is expected to occur. It meets the following requirements as outlined in the methodology:

- It is the forest area closest to the project area and meets the minimum area requirement (i.e., ≥90% of project area). The leakage belt covers 104,015 hectares which is greater than 95% of the project area.
- All parts of the leakage belt are accessible and reachable by agents of deforestation.
- The leakage belt is spatially biased in terms of distance of edge of belt from edge of project area. This was necessary as the agents of deforestation would be unlikely to convert land in the interior of the project area. Rather the leakage belt was delineated as if the project area was was a round shape rather than a “C” shape. This is justified as much of the area in the center of the “C” shape is land utilized year round by Masai.

- The leakage belt is 100% forest at the start of the project.

Parts of the leakage belt boundaries were delineated and georeferenced were delineated and georeferenced as part of the establishment of the WMA, as the leakage belt shares a border with the project area.

Figure 3.3. Project Area and Leakage Belt Demonstrating Exclusion of Historically Deforested Areas.



Temporal Boundaries

The temporal boundaries of the Project are listed below.

- January 1, 2005 to December 31, 2015 - Start date and end date of the historical reference period.
- April 27th, 2016 - April 26th, 2026 - Start date and end date of the first project baseline period.
- April 27th, 2016 - Date at which the project baseline will be revisited. The baseline must be renewed every 10 years from the project start date.

Estimation of Annual Areas of Unplanned Deforestation

The rate of deforestation was derived from an analysis of deforestation occurring within the RRD during the historical reference period, 2005-2015.

Analysis of Historical Deforestation

Landsat TM, ETM and OLI imagery, medium resolution remotely sensed spatial data from the years 2005, 2010 and 2015 were acquired for analysis. A Minimum Mapping Unit (MMU) of 0.36 ha (2 * 2 Landsat pixels or 60 m * 60 m) was used to most closely conform with the Tanzania DNA forest definition minimum area of 0.5 ha. Land cover classifications of forest and non- forest were created for each time step using supervised classification techniques following best practice in remote sensing. Forest cover change between 2005, 2010 and 2015 was assessed from this time series of classified Landsat imagery (data and analysis, including classification accuracy assessment, presented in project database).

An accuracy assessment of the 2015 forest/nonforest map was performed using 110 ground truth points per class[44] for a total of 220 ground truthing points derived from high-resolution imagery in Google Earth (e.g. Quickbird). The Quickbird satellite collects multispectral imagery at 2.4 and 2.8 meter resolutions, thus meets the requirements of the methodology of < 5m resolution for ground truthing imagery. Distribution of validation point was limited to areas where high resolution imagery was available for corresponding dates to the classification imagery. Within these high-resolution scenes accuracy assessment points were randomly distributed. As availability of high resolution imagery corresponds to areas of active deforestation and development, it follows that these scenes are a mosaic landscape with patches of forest/nonforest. It is within this mosaic landscape where classification is most likely to be erroneous due to the scale at which deforestation is taking place and the resolution of Landsat which can create the challenge of mixed pixels. As such, the higher concentration of accuracy assessment points within these mosaicked landscapes is not only logical since deforestation is most prevalent here, but it is also where classification errors are more likely, thus increasing the difficulty of attaining the requisite classification accuracy.

All ground truthing sample points used to assess classification accuracy have been documented in a kml file and archived. All verification samples gathered from high-resolution imagery were from within 12 months of the classification year. Points were then compared to the forest/non-forest classification for 2015. The accuracy of the 2015 forest/non-forest map was 95.5% for both the forest and non-forest class[45]. This meets the minimum map accuracy of 90% for each class as set forth in the methodology.

Estimation of the Annual Areas of Unplanned Baseline Deforestation in the RRD

Annual estimates of deforestation within the RRD were derived by calculating the amount of all deforestation within the boundary of the RRD from 2005-2015 (which already has all the deforestation prior to 2005 removed, see Figure 3.1). The result was the amount of deforestation within the RRD in the historical reference period. This was then summarized by year yielding the results found in Table 3.8.

Table 3.8. Annual Amount of Deforestation in the RRD.

Year	Area of deforestation in RRD (ha/yr)
2005-2010	162,738
2010-2015	199,332
Average	181,035

As there are only 2 data points on the amount of deforestation in the RRD, the mean area deforested across the historical reference period (ABSL,RRD,unplanned,t), located above in Table 3.8, is used for each year in the baseline period.

ABSL,RRD,unplanned,t = 181,035 ha

Estimation of Annual Areas of Unplanned Baseline Deforestation in the Project Area

The projected amount of unplanned baseline deforestation in the RRL is estimated using Equation 3.1.
Equation 3.1. Equation to calculate projected area of deforestation in the RRL.

[44] Congalton (2005) suggests a sample sizes of 50 to 100 assesment points for each map category. Congalton, R. G. 2005. Thematic and Positional Accuracy Assessment of Digital Remotely Sensed Data. 2005 Proceedings of the Seventh Annual Forest Inventory and Analysis Symposium. 2005 October 3–6; Portland, ME.

[45] More detailed results of the accuracy assessment can be found in the project database.

$$A_{BSL,RR,unplanned,t} = A_{BSL,RRD,unplanned,t} * P_{RRL}$$

Table 3.9. Projected Area of Unplanned Baseline Deforestation in the RRL.

Parameter	Description	Value	Justification
ABSL,RR,unplanned,t	Projected area of unplanned baseline deforestation in the reference region for location (RRL) in year t; ha	112,931	
ABSL,RRD,unplanned,t	Projected area of unplanned baseline deforestation in RRD in year t; ha	181,035	Derived in Section 3.2.1
PRRL	Ratio of forest area in the RRL at the start of the baseline period to the total area of the RRD; dimensionless	0.624	RRL2005Forest = 3,126,053 ha RRD = 5,011,230 ha

ABSL,RR,unplanned,t = 112,931 ha per year

Location and Quantification of Threat of Unplanned Deforestation

Spatial analysis was conducted with the IDRISI TERRSET software (Eastman 2011), and the Land Change Modeler (LCM) which is an integrated software environment. LCM is a spatially-explicit modeling tool that was used to model the location of deforestation projected in the baseline for both the project area and leakage belt. LCM was developed by Clark Labs in conjunction with the Andes Center of Biodiversity Conservation of Conservation International, and has been tested extensively (Clark labs 2007). LCM provides a wide range of tools organized in a series of steps for analyzing land cover change; modeling potential for change; predicting change and validating results. For this analysis, LCM was used to produce a vulnerability map of the project area and leakage belt. Translation of the vulnerability map into a scenario map of deforestation through the project term was conducted with a rank and assign operation. This model meets the criteria of (1) being peer-reviewed, (2) transparent, (3) incorporating spatial datasets used to explain patterns of deforestation, and (4) is capable of projecting the location of future deforestation (Kim 2010, Sangermano et al., 2010, Eastman et al., 2005).[46]

All spatial modeling analysis is performed on the reference region for projecting location of deforestation (RRL). The RRL is defined in section 3.2.1 and encompasses the area surrounding the project area and leakage belt (see Figure 3.1). Information from the reference region is analyzed under a spatially explicit modeling framework to construct future scenarios of how deforestation can be allocated in the reference region. In conformance with the VCS modular REDD methodology VM0007, location analysis was conducted since the initial configuration of the RRL landscape was a frontier configuration.

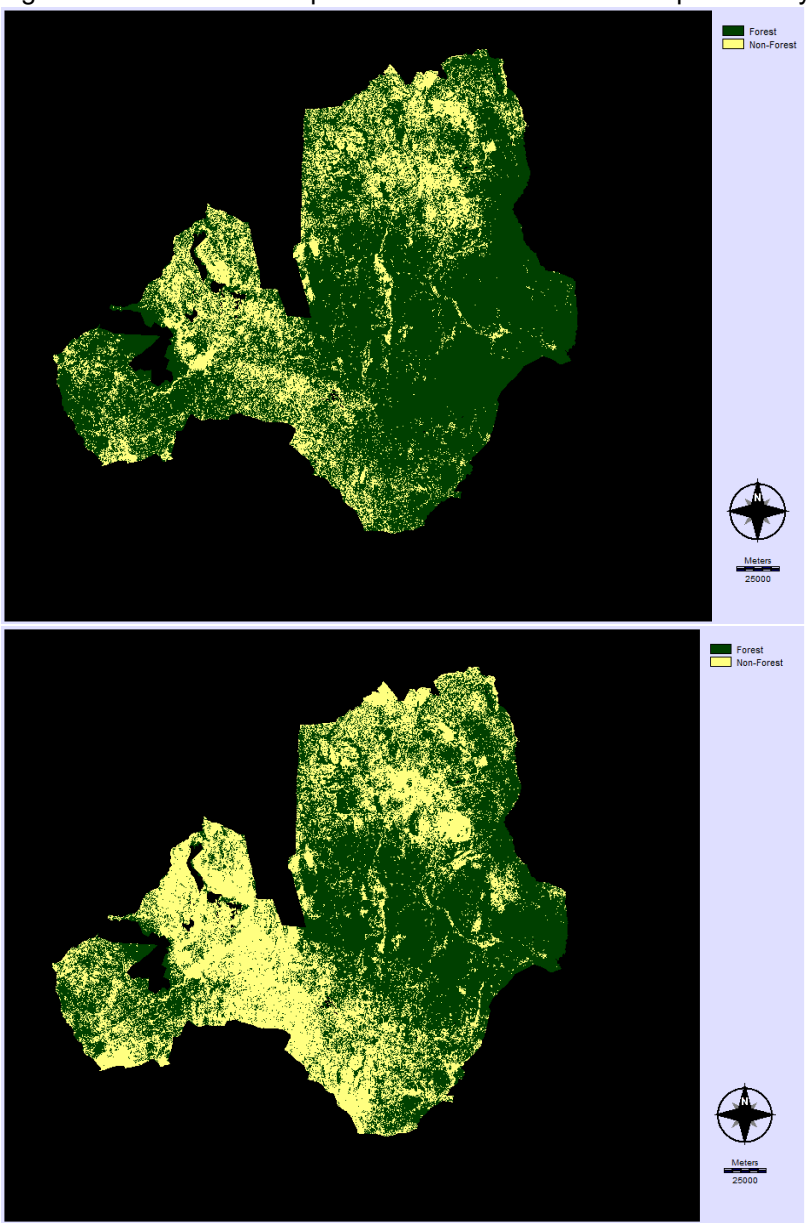
Preparation of Datasets for Spatial Analysis

[46] Kim, O S. 2010. An Assessment of Deforestation Models for Reducing Emissions from Deforestation and Forest Degradation (REDD). *Transactions in GIS*. 14(5): 631-654.
Eastman J R, Van Fossen M E, and Solorzano L A 2005 Transition potential modeling for land cover change. In Maguire D J, Batty, and Goodchild M F (eds), GIS, *Spatial Analysis and Modeling*. Redlands CA, ESRI Press: 357–86.
Sangermano,F. Eastman, J R, and Zhu, V. 2010. Similarity Weighted Instance-based Learning for the Generation of TransitionPotentials in Land Use Change Modeling. *Transactions in GIS*. 14(5): 569–580.f

Land Cover Maps used for Model Calibration

Land cover maps from 2005, 2010 and 2015 (Figure 3.4) along with GIS coverages of spatial driver variables were analyzed with LCM to produce >50 different candidate vulnerability maps using different combinations of drivers. Remote sensing data used for imagery classification was derived from Landsat imagery as described above.

Figure 3.4. Land cover maps for 2005 and 2015 used in spatial analysis (2010 not shown).



Land cover change modeling requires two phases; calibration and validation. The first time step, 2005-2010 was used to calibrate the model and the second time step 2010-2015 was used to validate the model's predictive capacity. For calibration, the classified maps from the first two time points (2005 and 2010) were analyzed. Locations that experienced a transition from forest to non-forest ("transition") and locations that do not transition but remained as forest ("persistence") were used to develop and test for relationships with potential driver variables. A large number of training sample locations was randomly chosen from both of these categories. This number may be user-defined, and in this model was set to 5,000 samples. An equal number of randomly selected locations were used to test the predictive capacity of the model within the calibration phase, and inform the adjustment of the weights of the input variables.

Developing a predictive model is an iterative process that requires exploration of the spatial variables that may drive deforestation patterns. Variables that have demonstrated strong correlation with deforestation in the field of land change science are categorized in the methodology into four categories: landscape factors, accessibility factors, anthropogenic factors, actual land tenure and management. All variables must be spatially explicit, and for use in the model must be in raster format. Spatial variable used in the model are called factor maps

Potential drivers of deforestation were assessed with input from regional experts, literature review and input from other land change modeling efforts. Assessment of factors that should be included in the model is an iterative process that is done by assessing multiple model runs while removing and adding variables selectively. Performance assessment of the combination of factor maps and their predictive capacity is done at multiple stages of the analysis. This results in a general assessment of the models accuracy, and can be used to evaluate if factors have increased or decreased the models performance. Commonly used transformations for variables were also explored. Although transformations are only required for logistic regression modeling, where variables must be linearly related to the potential for transition, transformations can improve the performance of other models, especially where there may be strong non-linearities, thus yielding higher accuracy. Distance based variables were tested to see if transformations improved model accuracy. These transformations included the natural log transformation (ln) which is commonly effective in linearizing distance decay variables, a square root transformation, which can assist in enhancing the importance of small changes in distance, and categorization of distances into classes, which can help to tease out the critical zones of distance-related functions. Factor maps explored in the modeling and included in the final model are listed in Table 3.10.

Table 3.10. Factor Maps that were Incorporated in the Final Spatial Model.

Factors Considered	Description	Included in Final Model
Accessibility Factors	Distance to Roads	Yes
Anthropogenic Factors	Distance to Deforestation	Yes
	Distance to Towns	Yes
	Distance to Forest Edge	Yes
	Poverty Indices (% of population in poverty)[47]	Yes
Landscape Factors	Elevation	Yes
	Slope	No
	Soil	No
	Precipitation	No
	Distance to water sources	No
	Vegetation	No
Actual Land Tenure & Management	Distance to Protected Areas	Yes
	Distance to Management Areas	No

Preparation of Risk Maps for Deforestation

Validation of the model is done by comparing the predicted change to actual change for the period from 2010 to 2015. The output of the model is a transition potential map or a “risk map” that expresses the likelihood or potential for a location to transition from forest to deforested on a scale from 0 (minimum

[47] Tatem AJ, Gething PW, Bhatt S, Weiss D and Pezzulo C (2013) Pilot high resolution poverty maps, University of Southampton/Oxford.

potential) to 1 (maximum potential). These values can be ranked in descending order, and this map is used to assign pixels to deforestation.

Quantity of deforestation was estimated in a separate analysis detailed above using average historic rate of deforestation in the RRD. Areas of deforestation were allocated until the quantity of deforestation modeled was exhausted. The procedure was carried out for each year in the baseline, 2017-2027.

Selection of the Most Accurate Deforestation Risk Map

An artificial neural network was used to develop the risk maps, and the following procedures were followed to meet the requirements of model calibration and confirmation form the methodology:

For the calibration period, a minimum of 5,000 samples (pixels) of the "transition" category (forest to non-forest) and 5,000 samples (pixels) of the "persistence" category (locations that do not transition but remain as forest) were randomly selected and used for training and testing. A minimum of 10,000 iterations of the model were run before selecting the best fit model.

Using the above process, multiple risk maps and the corresponding prediction maps were created for the year 2010. Each prediction map is compared to the actual map from 2010 to assess the model's performance. The measure of performance used as mandated by the methodology is the "Figure of Merit" (FOM) that confirms the model prediction in statistical manner (Pontius et al. 2008[48]; Pontius et al. 2007[49]). The FOM is a ratio of the intersection of the observed change (change between the reference maps in time 1 and time 2) and the predicted change (change between the reference map in time 1 and simulated map in time 2) to the union of the observed change and the predicted change. The FOM ranges from 0%, where there is no overlap between observed and predicted change, to 100% where there is a perfect overlap between observed and predicted change. The highest percent FOM and least number of factor maps used for creating the deforestation risk map must be used as the criteria for selecting the most accurate deforestation risk map to be used for predicting future deforestation.

Equation 3.2. Equation to Determine the "Figure of Merit".

$$FOM = \frac{CORRECT}{CORRECT + Err_A + Err_B}$$

Where,

CORRECT	Area correct due to observed change predicted as change; ha
ErrA	Area of error due to observed change predicted as persistence; ha
ErrB	Area of error due to observed persistence predicted as change; ha

The final model was selected from multiple runs, according to the methodology as having the highest FOM value with the fewest number of factor maps with a minimum of one factor map in each of the four categories defined.

FOM 141,255 ha / (141,255 ha + 283,906 ha + 283,906) = 0.199

%FOM = 19.9%

The minimum threshold for the best fit as measured by the Figure of Merit (FOM) is defined by the net observed change in the reference region for the calibration period of the model (2005-2010). Net observed change is calculated as the total area of change being modeled in reference region during the

[48] R G Pontius Jr, W Boersma, J-C Castella, K Clarke, T de Nijs, C Dietzel, Z Duan, E Fotsing, N Goldstein, K Kok, E Koomen, C D Lippitt, W McConnell, A Mohd Sood, B Pijanowski, S Pithadia, S Sweeney, T N Trung, A T Veldkamp, and P H Verburg. 2008. Comparing input, output, and validation maps for several models of land change. Annals of Regional Science, 42(1): 11-47.

[49] R G Pontius Jr, R Walker, R Yao-Kumah, E Arima, S Aldrich, M Caldas and D Vergara. 2007. Accuracy assessment for a simulation model of Amazonian deforestation. Annals of Association of American Geographers, 97(4): 677-695.)

calibration period as percentage of the total area of the reference region. Net change from 2005-2010 was 378,075 hectares out of a total of 4,199,540 which is 9% of total area. The FOM value therefore meets the minimum threshold.

Mapping of the Locations of Future Deforestation

From the model, a future deforestation risk map was created to assign a likelihood of deforestation to each pixel. Using a rank operation, all forested pixels of the RRL were ranked in descending order, so that the pixel with the highest likelihood of deforestation was assigned a value of 1. Future deforestation was assumed to happen first at the pixel locations with the highest deforestation risk value, so each pixel was allocated to deforestation in rank order for each year according to the annual projections from 2017- 2026 ($A_{BSL,RR,unplanned,t}$). This operation resulted in a single map showing the predicted deforestation over the baseline period (Figure 3.5) in the project area and surrounding reference region. Further, the area of baseline deforestation for the project area and leakage belt was summed by strata for each year in the baseline period (Table 3.11 and Table 3.12).

Figure 3.5. Map of the Predicted Deforestation in the Baseline Period, 2017-2026.

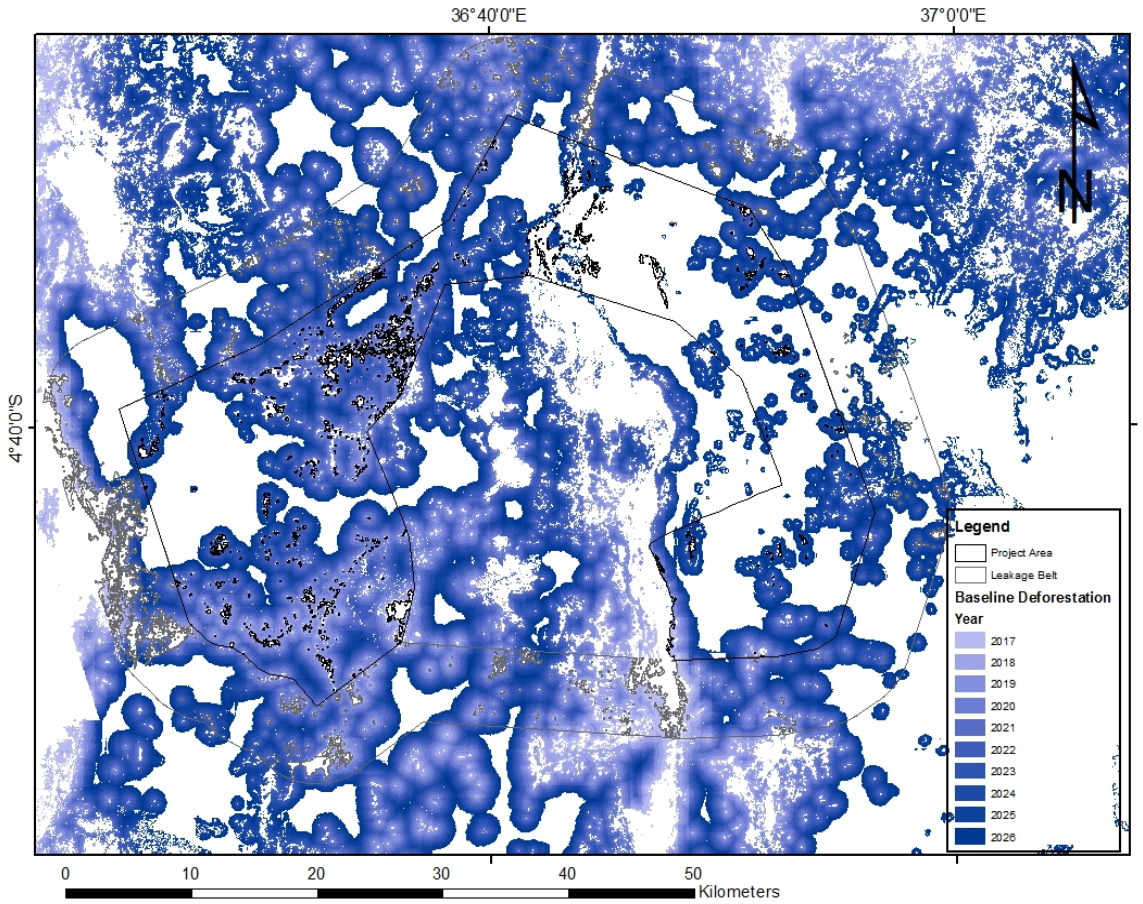


Table 3.11. Amount of Baseline Deforestation (ha) in the Project Area.

Year	Aunplanned,i,t, MAS (ha)	AAunplanned,i,t, MWF (ha)
2017	151.2	21.3
2018	1411.8	67.0
2019	3519.0	256.8
2020	5426.3	547.0
2021	5090.8	655.5
2022	6354.3	1140.3
2023	5698.2	1473.8
2024	6158.7	2095.8
2025	6742.0	2763.0
2026	5641.4	2795.6
Total	46193.8	11816.1

Table 3.12. Amount of Baseline Deforestation (ha) in the Leakage Belt.

Year	Aunplanned,i,t, MAS (ha)	AAunplanned,i,t, MWF (ha)
2017	1874.6	212.7
2018	2682.4	487.2
2019	3581.4	688.2
2020	4918.1	1373.9
2021	5136.9	1713.0
2022	7081.5	2790.7
2023	6609.4	2936.8
2024	6622.5	3570.3
2025	6809.5	3666.7
2026	5509.4	3534.8
Total	50825.9	20974.5

Estimation of Carbon Stock Changes and GHG Emissions

Stratification of the Total Area Subject to Deforestation

The project area was stratified, according to module X-STR, using a land cover map developed as part of the Northern Tanzania Rangeland Initiative[50]. The forest types present in the Project area include Acacia dominated shrubland (MAS) and Acacia-Commiphora woodland (MWF). A map of the vegetation strata in the project area and leakage belt can be found in Figure 2.8.

Table 3.13. Areas of Strata within the Project Area.

Stratum	Stratum Description	Area (hectares)
MAS	Acacia dominated shrubland	71,990
MWF	Acacia-commiphora woodland	32,075

Table 3.14. Areas of Strata within the Leakage Belt.

Stratum	Stratum Description	Area (hectares)
MAS	Acacia dominated shrubland	71,940
MWF	Acacia-commiphora woodland	32,075

Estimation of Carbon Stocks and Carbon Stock Changes per Stratum

Forest carbon stocks were directly measured in a forest inventory of the project area in 2016-2017. Results are detailed in the "Forest biomass carbon inventory for the Makame Project, Kiteto District, Tanzania" 2017 which can be found in the project database. Results are summarized by forest strata in the tables below.

Equation 3.3. Equation to Calculate Carbon Stocks in all Carbon Pools in Each Forest Stratum.

$$C_{BSL,i} = C_{AB\_tree,i} + C_{BB\_tree,i} + C_{AB\_non-tree,i} + C_{BB\_non-tree,i} + C_{DW,i} + C_{LI,i} + C_{SOC,i}$$

[50] Land-cover map developed by Dan Kelly, The Nature Conservancy in Arusha, Tanzania.

Table 3.15a. Estimation of Carbon Stocks for Stratum MAS.

Parameter	Description	Value	Justification
CBSL,i	Carbon stock in all carbon pools in forest stratum i; t CO_2e ha-1	54.6 t CO_2e ha-1	See forest inventory for calculations.
CAB_tree,i	Carbon stock in aboveground tree biomass in stratum i; t CO_2e ha-1	See forest inventory report for calculations.	
CBB_tree,i	Carbon stock in belowground tree biomass in stratum i; t CO_2e ha-1	See forest inventory report for calculations	
CDW,i	Carbon stock in dead wood in stratum i; t CO_2e ha-1	See forest inventory report for calculations	

Table 3.15b. Estimation of Carbon Stocks for Stratum MWF.

Parameter	Description	Value	Justification
CBSL,i	Carbon stock in all carbon pools in forest stratum i; t CO_2e ha-1	99.0 t CO_2e ha-1	See forest inventory for calculations.
CAB_tree,i	Carbon stock in aboveground tree biomass in stratum i; t CO_2e ha-1	See forest inventory report for calculations.	
CBB_tree,i	Carbon stock in belowground tree biomass in stratum i; t CO_2e ha-1	See forest inventory report for calculations	
CDW,i	Carbon stock in dead wood in stratum i; t CO_2e ha-1	See forest inventory report for calculations	

Stocks of belowground biomass and dead wood are emitted from the year of conversion/deforestation at a linear rate equal to 1/10 of the initial stock annually, for 10 years. Net emissions (CBSL -C post) from steady decomposition of these pools are elaborated in Tables 3.16 and 3.17, below.

Table 3.16a. Emissions from steady decomposition of belowground biomass post deforestation in the project area ($CBSL_{BB}$ -C $post_{BB,}$ t CO2-e).

Year	BGB Emissions from Deforestation (t CO2)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
2017	2,255	225	225	225	225	225	225	225	225	225	225
2018	18,245		1,824	1,824	1,824	1,824	1,824	1,824	1,824	1,824	1,824
2019	47,394			4,739	4,739	4,739	4,739	4,739	4,739	4,739	4,739
2020	76,304				7,630	7,630	7,630	7,630	7,630	7,630	7,630
2021	74,626					7,463	7,463	7,463	7,463	7,463	7,463
2022	100,026						10,003	10,003	10,003	10,003	10,003
2023	99,334							9,933	9,933	9,933	9,933
2024	118,099								11,810	11,810	11,810
2025	139,291									13,929	13,929
2026	126,881										12,688
Total		225	2,050	6,789	14,420	21,882	31,885	41,818	53,628	67,557	80,246

Table 3.16b. Emissions from steady decomposition of belowground biomass post deforestation in the leakage belt ($CBSL_{BB}$ -C $post_{BB,}$ t CO2-e).

Year	BGB Emissions from Deforestation (t CO2)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
2017	26,869	2,687	2,687	2,687	2,687	2,687	2,687	2,687	2,687	2,687	2,687
2018	42,350		4,235	4,235	4,235	4,235	4,235	4,235	4,235	4,235	4,235
2019	57,349			5,735	5,735	5,735	5,735	5,735	5,735	5,735	5,735
2020	87,909				8,791	8,791	8,791	8,791	8,791	8,791	8,791
2021	97,757					9,776	9,776	9,776	9,776	9,776	9,776
2022	143,927						14,393	14,393	14,393	14,393	14,393
2023	141,424							14,142	14,142	14,142	14,142
2024	155,107								15,511	15,511	15,511
2025	159,392									15,939	15,939
2026	141,092										14,109
Total		2,687	6,922	12,657	21,448	31,223	45,616	59,759	75,269	91,208	105,318

Table 3.17a. Emissions from steady decomposition of dead wood post deforestation in the project area, ($CBSL_{DW}$ -C $post_{DW,}$ t CO2-e).

Year	BGB Emissions from Deforestation (t CO2)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
2017	53	5	5	5	5	5	5	5	5	5	5
2018	316		32	32	32	32	32	32	32	32	32
2019	911			91	91	91	91	91	91	91	91
2020	1,611				161	161	161	161	161	161	161
2021	1,707					171	171	171	171	171	171
2022	2,573						257	257	257	257	257
2023	2,926							293	293	293	293
2024	3,853								385	385	385
2025	4,861									486	486
2026	4,732										473
Total		5	37	128	289	460	717	1,010	1,395	1,881	2,354

Table 3.17b. Emissions from steady decomposition of dead wood post deforestation in the leakage belt ($CBSL_{DW}$ -C $post_{DW,}$ t CO2-e).

Year	BGB Emissions from Deforestation (t CO2)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
2017	589	59	59	59	59	59	59	59	59	59	59
2018	1,094		109	109	109	109	109	109	109	109	109
2019	1,513			151	151	151	151	151	151	151	151
2020	2,666				267	267	267	267	267	267	267
2021	3,166					317	317	317	317	317	317
2022	4,953						495	495	495	495	495
2023	5,079							508	508	508	508
2024	5,951								595	595	595
2025	6,112									611	611
2026	5,725										573
Total		59	168	320	586	903	1,398	1,906	2,501	3,112	3,685

Estimation of the Sum of Baseline Carbon Stock Changes

The sum of baseline carbon stock changes (ΔCTOT) was estimated using Equation 3.4. Parameters for use of Equation 3.4 can be found in Table 3.18. One of the parameters, the total forest carbon stock in areas deforested (CBSL), was calculated as per Equation 3.5. ΔCTOT and CBSL are calculated in Table 3.20 for the project area and 3.21 for the leakage belt.

Equation 3.4. Equation to Calculate the Sum of the Baseline Carbon Stock Change in all Pools up to Time t

$$\Delta C_{TOT} = C_{BSL} - C_{post} - C_{wp}$$

Table 3.18. Estimation of Sum of Baseline Carbon Stock Changes in the Project Area and Leakage Belt.

Parameter	Description	Value	Justification
ΔCTOT	Sum of the baseline carbon stock change in all pools up to time t*; t CO_2e	See calculations below.	
CBSL	Total forest carbon stock in areas deforested; t CO_2e	See calculations below.	See calculations below.
C post	Total post-deforestation carbon stock in areas deforested; t CO_2e	See calculations below.	As no live trees or standing dead trees remain after conversion to agricultural lands, Cpost has been set to 0 tCO2/ha.
C wp	Total carbon stock in harvested wood products; t CO_2e	0	No commercial harvesting of wood products takes place in either the baseline or with project scenarios.

Equation 3.5. Equation to Calculate the Sum of the Baseline Carbon Stock Change in all Pools up to Time t

$$C_{BSL} = \sum_{t=1}^{t^*} \sum_{i=1}^{M} ((C_{BSL,i}) * A_{unplanned,i,t})$$

Table 3.19. Parameters used to calculate the total forest carbon stock in areas deforested.

Parameter	Description
CBSL	Total forest carbon stock in areas deforested; t CO2-e
CBSL,i	Carbon stock in all carbon pools in the forest stratum i; t CO2-e ha-1
Aunplanned,i,t	Area of unplanned deforestation in forest stratum i at time t; ha

Table 3.20. Calculation of the Total Forest Carbon Stock in Areas Deforested (CBSL) and the Sum of the Baseline Carbon Stock Change in all Pools up to Time t (ΔCTOT) in the Project Area.

Year	Aunplanned,i,t, MAS (ha)	AAunplanned,i,t, MWF (ha)	$CBSL_{AB}$ (t CO2-e)	C $post_{AB}$ (t CO2-e)	$CBSL_{BB}$ -C $post_{BB}$ (t CO2-e)	$CBSL_{DW}$ -C $post_{DW}$ (t CO2-e)	C wp (t CO2-e)	ΔCTOT (t CO2-e)
2017	151.2	21.3	8,053	0	225	5	0	8,283
2018	1411.8	67.0	65,160	0	2,050	37	0	67,247
2019	3519.0	256.8	169,266	0	6,789	128	0	176,183
2020	5426.3	547.0	272,515	0	14,420	289	0	287,224
2021	5090.8	655.5	266,521	0	21,882	460	0	288,864
2022	6354.3	1140.3	357,235	0	31,885	717	0	389,837
2023	5698.2	1473.8	354,764	0	41,818	1,010	0	397,592
2024	6158.7	2095.8	421,781	0	53,628	1,395	0	476,805
2025	6742.0	2763.0	497,468	0	67,557	1,881	0	566,907
2026	5641.4	2795.6	453,148	0	80,246	2,354	0	535,748
Total	46193.8	11816.1	2,865,912	0	320,502	8,276	0	3,194,690

Table 3.21. Calculation of the Total Forest Carbon Stock in Areas Deforested (CBSL) and the Sum of the Baseline Carbon Stock Change in all Pools up to Time t (ΔCTOT) in the Leakage Belt.

Year	Aunplanned,i,t, MAS (ha)	AAunplanned,i,t, MWF (ha)	$CBSL_{AB}$ (t CO2-e)	C $post_{AB}$ (t CO2-e)	$CBSL_{BB}$ -C $post_{BB}$ (t CO2-e)	$CBSL_{DW}$ -C $post_{DW}$ (t CO2-e)	C wp (t CO2-e)	ΔCTOT (t CO2-e)
2017	1874.6	212.7	95,960	0	2,687	59	0	98,706
2018	2682.4	487.2	151,250	0	6,922	168	0	158,341
2019	3581.4	688.2	204,818	0	12,657	320	0	217,794
2020	4918.1	1373.9	313,962	0	21,448	586	0	335,996
2021	5136.9	1713.0	349,131	0	31,223	903	0	381,257
2022	7081.5	2790.7	514,025	0	45,616	1,398	0	561,039
2023	6609.4	2936.8	505,086	0	59,759	1,906	0	566,750
2024	6622.5	3570.3	553,952	0	75,269	2,501	0	631,722
2025	6809.5	3666.7	569,257	0	91,208	3,112	0	663,578
2026	5509.4	3534.8	503,900	0	105,318	3,685	0	612,902
Total	50825.9	20974.5	3,761,341	0	452,106	14,638	0	4,228,085

Calculation of Net CO_2 Equivalent Emissions

Net CO_2 emissions in the baseline for the project area and leakage belt are calculated using Equation 3.6 below.

Equation 3.6. Equation to Calculate Net Greenhouse Gas Emissions in the Baseline from Unplanned Deforestation.

$$\Delta C_{BSL,unplanned} = \Delta C_{BSL,PA,unplanned} + GHG_{BSL,E}$$

As GHG emissions in the baseline are excluded from the project boundary, the net CO_2 emissions in the baseline is equal to the sum of the baseline carbon stock change in all pools (ΔCBSL,unplanned = ΔCTOT).

ΔCBSL,PA,unplanned = 3,194,690 t CO_2e

ΔCBSL,LK,unplanned = 4,228,085 t CO_2e

3.2.2 Project Emissions

Expected project emissions are estimated ex-ante and apply Equation 3.7 as found in module M-MON (VMD0015) of Methodology VM0007. Values for individual parameters are justified in Table 3.22 or derived in Tables 3.23, Table 3.25, and Table 3.27. Ex-ante projections of deforestation un-avoided in the project case assume project effectiveness of 80% (i.e., 20% of baseline deforestation occurs in the project case).

Equation 3.7. Equation for Calculating the Net GHG emissions within the Project Area under the Project Scenario.

$$\Delta C_P = \sum_{t=1}^{t^*} \sum_{i=1}^{M} \left(\Delta C_{P,DefPA,i,t} + \Delta C_{P,Deg,i,t} + \Delta C_{P,DistPA,i,t} + GHG_{P-E,i,t} - \Delta C_{P,Enh,i,t} \right)$$

Table 3.22. Parameters and Values used to Calculate Annual Ex-Ante Project Emissions.

Parameter	Description	Value	Justification
ΔC_P	Net greenhouse gas emissions within the project area under the project scenario; t CO_2e	See table below for calculations.	
$\Delta C_{P,DefPA,i,t}$	Net carbon stock change as a result of deforestation in the project area in the project case in stratum i at time t; t CO_2e	See table below for calculations.	

$\Delta C_{P,Deg,i,t}$	Net carbon stock change as a result of degradation in the project area in the project case in stratum i at time t; t CO_2e	$\Delta C_{P,Deg,i,t} = 0$	No emissions from degradation are expected to occur due to the prevalence of available fuelwood outside the project area. Forest patrols will further deter degradation activities. Ex-ante degradation is therefore estimated as zero. Emissions resulting from degradation due to selective logging of FSC certified areas (parameter ΔCP,SelLog,i,t) equates to zero as no selective FSC logging occurs in either the baseline or with-project case.
$\Delta C_{P,DistPA,i,t}$	Net carbon stock change as a result of natural disturbance in the project area in the project case in stratum i at time t; t CO_2e	$\Delta C_{P,DistPA,i,t} = 0$	Forests in Kiteto district have a low incidence of natural disturbance and hence no disturbances are likely which result in tree death and CO2 emissions.
$GHG_{P-E,i,t}$	Greenhouse gas emissions as a result of deforestation and degradation activities within the project area in the project case in stratum i in year t; t CO_2e	See table below for calculations.	
$\Delta C_{P,Enh,i,t}$	Net carbon stock change as a result of forest growth and sequestration during the project in areas projected to be deforested in the baseline in stratum i at time t; t CO_2e	$\Delta C_{P,Enh,i,t} = 0$	Conservative to exclude.

Table 3.23. Data used to Calculate ΔC_P.

Year	ΔCP,DefPA,i,t (t CO2-e)	ΔCP,Deg,i,t (t CO2-e)	ΔCP,DistPA,i,t (t CO2-e)	GHGP-E,i,t (t CO2-e)	ΔCP,Enh,i,t (t CO2-e)	ΔCP (t CO2-e)
2017	2,355	0	0	99	0	2,454
2018	20,195	0	0	846	0	21,041
2019	51,565	0	0	2,159	0	53,724
2020	81,573	0	0	3,416	0	84,989
2021	78,474	0	0	3,286	0	81,759
2022	102,349	0	0	4,285	0	106,635
2023	97,944	0	0	4,101	0	102,045
2024	112,727	0	0	4,720	0	117,447
2025	129,804	0	0	5,435	0	135,239
2026	115,220	0	0	4,824	0	120,044

Deforestation in the with Project Case

Equation 3.8, Equation for Calculating the Net Carbon Stock Change as a Result of Deforestation in the Project Case.

$$\Delta C_{P,DefPA,i,t} = \sum_{u=1}^{U} \left(A_{DefPA,u,i,t} * \Delta C_{pools,P,Def,u,i,t} \right)$$

Table 3.24. Parameters and Values used to Calculate Annual Ex-Ante Deforestation Emissions.

Parameter	Description	Value	Justification
ΔCP,DefPA,i,t	Net carbon stock change as a result of deforestation in the project case in the project area in stratum i at time t; t CO_2e	See table below for calculations.	See table below for calculations.
ADefPA,u,i,t	Area of recorded deforestation in the project area stratum i converted to land use u at time t; ha	See table below for calculations.	See table below for calculations.
ΔCpools,Def,u,i,t	Net carbon stock changes in all pools in the project case in land use u in stratum i at time t; t CO_2e ha-1	ΔCpools,Def,u,i,t = 68.3	This value is the strata area weighted mean. See the forest inventory report for more information on the derivation of this value.

Table 3.25. Data Used to Calculate ΔCP,DefPA,i,t.

Year	ADefPA,u,i,t (ha)	ΔCpools,Def,u,i,t (t CO2-e/ha)	ΔCP,DefPA,i,t (t CO2-e)
2017	34.5	68.3	2,355
2018	295.8	68.3	20,195
2019	755.2	68.3	51,565
2020	1,194.7	68.3	81,573
2021	1,149.3	68.3	78,474
2022	1,498.9	68.3	102,349
2023	1,434.4	68.3	97,944
2024	1,650.9	68.3	112,727
2025	1,901.0	68.3	129,804
2026	1,687.4	68.3	115,220
ADefPA,u,i,t is derived assuming a project effectiveness of 80% (i.e., 20% of baseline deforestation occurs in the project case).			

GHG Emissions

Greenhouse gas emissions as a result of deforestation activities within the project area (GHGP,E,i,t) and leakage belt are calculated in Table 3.27 using Equation 3.9. Parameters are found in Table 3.27a and Table 3.27b.

Equation 3.9. Equation for Calculating GHG Emissions as a Result of Deforestation Activities within the Project Area in the Project Case.

$GHG_{P\text{-}E,i,t} = E_{BiomassBurn,i,t}$ = Aburn,i,t * Bi,t * COMF I * Gg,I * 10^-3 * GWPg

Table 3.26. Parameters and Values Used to Calculate Annual Ex-Ante GHG Emissions.

Parameter	Description	Value	Justification
GHGP,E,i,t	Greenhouse gas emissions as a result of deforestation activities within the project area in the project case in stratum i in year t; t CO_2e	See table below for calculations.	
EBiomassBurn,i,t	Non-CO_2 emissions due to biomass burning in stratum i in year t; t CO_2e	See table below for calculations.	Biomass burning is expected to occur in the with project case.

Table 3.27a. Calculation of $E_{BiomassBurn,i,t.}$ for the project area.

Year	ADefPA,u,i,t (ha)	COMF	E-N2O Biomass Burning (tCO2e)	E-CH4 Biomass Burning (tCO2e)	E-Biomass Burning (tCO2e)	GHGP-E,i,t (t CO2-e)
2017	34.5	0.45	29.9	68.8	98.6	98.6
2018	295.8	0.45	256.0	589.6	845.6	845.6
2019	755.2	0.45	653.6	1,505.4	2,159.0	2,159.0
2020	1194.7	0.45	1,034.0	2,381.5	3,415.5	3,415.5
2021	1149.3	0.45	994.7	2,291.0	3,285.8	3,285.8
2022	1498.9	0.45	1,297.4	2,988.1	4,285.4	4,285.4
2023	1434.4	0.45	1,241.5	2,859.5	4,101.0	4,101.0
2024	1650.9	0.45	1,428.9	3,291.1	4,720.0	4,720.0
2025	1901.0	0.45	1,645.4	3,789.6	5,435.0	5,435.0
2026	1687.4	0.45	1,460.5	3,363.9	4,824.3	4,824.3

Table 3.27b. Calculation of $E_{BiomassBurn,i,t.}$ for the leakage belt.

Year	ADefLB,u,i,t (ha)	COMF	E-N2O Biomass Burning (tCO2e)	E-CH4 Biomass Burning (tCO2e)	E-Biomass Burning LB (tCO2e)
2012	20.7	0.45	17.9	41.3	59.2
2013	177.5	0.45	153.6	353.8	507.4
2014	453.1	0.45	392.2	903.3	1,295.6
2015	716.8	0.45	620.5	1,429.1	2,049.5
2016	689.6	0.45	596.9	1,374.8	1,971.6
2017	899.4	0.45	778.5	1,793.0	2,571.5
2018	860.6	0.45	745.0	1,715.9	2,460.8
2019	990.5	0.45	857.4	1,974.8	2,832.2
2020	1140.6	0.45	987.3	2,274.0	3,261.3
2021	1012.4	0.45	876.4	2,018.5	2,894.9

3.2.3 Leakage

Leakage emissions from displacement of unplanned deforestation are estimated in conformance with the VCS modular REDD methodology VM0007, specifically the LK-ASU module. This module provides for accounting for activity shifting leakage resulting from both local and immigrant deforestation agents.

Estimation of Baseline Carbon Stock Changes and Greenhouse Gas Emissions in the Leakage Belt

Activity shifting leakage due to displacement of unplanned deforestation was assessed using a baseline specific to the leakage belt developed following procedures detailed in the Module BL-UP. While details of the baseline are provided in Table 3.21, Table 3.28 below states the baseline estimates for the leakage belt, against which with-project deforestation in the leakage belt will be measured.

Table 3.28. Estimation of Baseline Carbon Stock Changes and Greenhouse Gas Emissions in the Leakage Belt.

Year	ΔCTOT (t CO2-e)
2017	98,706
2018	158,341
2019	217,794
2020	335,996
2021	381,257
2022	561,039
2023	566,750
2024	631,722
2025	663,578
2026	612,902

Estimation of the Proportions of Area Deforested by Immigrant and Local Deforestation Agents in the Baseline

Results of the community surveys, implemented in the fall of 2016, indicated than only 2 of the 22 communities have migrated to the area within the last five years.[51]

$PROP_{RES}$ = the proportion of area deforested by the population that has been resident in and around the leakage belt and project area for ≥ 5 years = 0.909; and

$PROP_{IMM}$ = the proportion of area deforested by population that has migrated into the area in the last 5 years = 0.091.

Estimation of Unplanned Deforestation Displaced from the Project Area to the Leakage Belt

Ex-ante baseline emissions occurring in the leakage belt are estimated by first estimating the amount of deforestation that is thought to be displaced from the project area to the leakage belt. As the WMA increase patrols of the project area and surround areas, leakage is likely to be deterred. The leakage factor is estimated to be 0.15, or 15% of baseline emissions in the project area. Leakage is then calculated as the difference between project and baseline carbon stock changes and greenhouse gas emissions in the leakage belt, as outlined in Equation 3.10. Ex-ante estimates of the net CO_2 emissions due to unplanned deforestation displaced from the project area to the leakage belt are calculated for each year in the baseline period in Table 3.29.

Equation 3.10. Equation for Calculating Net CO_2 Emissions due to Unplanned Deforestation Displaced from the Project Area to the Leakage Belt.

$$\Delta C_{LK-ASU-LB} = \Delta C_{P,LB} - \Delta C_{BSL,LK,unplanned}$$

[51] ibid

Table 3.29. Parameters and Values used to Calculate Annual Ex-Ante GHG Emissions in the Leakage Belt.

Parameter	Description	Value	Justification
ΔCLK-ASU-LB	Net CO_2 emissions due to unplanned deforestation displaced from the project area to the leakage belt; t CO_2e	See Table 3.30.	Calculated.
ΔCBSL,LK,unplanned	Net CO_2 emissions in the baseline from unplanned deforestation in the leakage belt; t CO_2e	See Table 3.28.	Derived in Section 3.1.
ΔCP,LB	Net greenhouse gas emissions within the leakage belt in the project case t CO_2e	See Table 3.30.	Ex-ante estimate is calculated by multiplying the estimated baseline carbon stock changes and greenhouse gas emissions for the project area by a factor < 1.0 representing the % of deforestation expected to be displaced into the leakage belt. This result is then added to the estimated baseline for the leakage belt.

Table 3.30. Estimates of the Net CO_2 Emissions due to Unplanned Deforestation Displaced from the Project Area to the Leakage Belt.

Year	Aunplanned,i,t, MAS (ha)	AAunplanned,i,t, MWF (ha)	$CBSL_{AB}$ (t CO2-e)	C $post_{AB}$ (t CO2-e)	$CBSL_{BB}$ -C $post_{BB}$ (t CO2-e)	$CBSL_{DW}$ -C $post_{DW}$ (t CO2-e)	C wp (t CO2-e)	ΔCTOT (t CO2-e)
2017	151.2	21.3	8,053	0	225	5	0	8,283
2018	1411.8	67.0	65,160	0	2,050	37	0	67,247
2019	3519.0	256.8	169,266	0	6,789	128	0	176,183
2020	5426.3	547.0	272,515	0	14,420	289	0	287,224
2021	5090.8	655.5	266,521	0	21,882	460	0	288,864
2022	6354.3	1140.3	357,235	0	31,885	717	0	389,837
2023	5698.2	1473.8	354,764	0	41,818	1,010	0	397,592
2024	6158.7	2095.8	421,781	0	53,628	1,395	0	476,805
2025	6742.0	2763.0	497,468	0	67,557	1,881	0	566,907
2026	5641.4	2795.6	453,148	0	80,246	2,354	0	535,748

Estimation of Unplanned Deforestation Displaced from the Project Area to Outside the Leakage Belt

Deforestation at the hands of immigrant agents outside the leakage belt is calculated in this section. The first step involves calculating the total available national forest area for unplanned deforestation, using Equation 3.11 and the values found in Table 3.31. AVFOR, was calculated to be 48,090,699 ha.

Equation 3.11. Equation for Calculating the Total Available National Forest Area for Unplanned Deforestation.

AVFOR = TOTFOR - PROTFOR - MANFOR

Table 3.31. Parameters and Values used to Calculate the Total Available National Forest Area for Unplanned Deforestation.

Parameter	Description	Value	Justification/Source
AVFOR	Total available national forest area for unplanned deforestation; ha	48,090,699	
TOTFOR	Total available national forest area; ha	48,090,699	page 40 NAFORMA Report
PROTFOR	Total area of fully protected forests nationally; ha	0	Conservatively set to zero
MANFOR	Total area of forests under active management nationally; ha	0	Conservatively set to zero
Ministry of Natural Resources and Tourism, Tanzania Forest Services Agency, Government of Finland, AND FAO. 2015. NAFORMA - National Forest Resources Monitoring and Assessment of Tanzania Mainland - Main Results.			

Next, the ratio (PROPLB) of the forested area of the leakage belt (LBFOR) to the total available national forest area (AVFOR) was calculated. PROPLB = 104,015 ha / 48,090,699 ha = 0.0021629.

The live aboveground tree carbon stock (COLB) was conservatively determined to be the average stock for Tanzanian forest using data from NAFORMA[52] as found in Table 3.32. COLB =56.4 t CO2-e ha-1.

Table 3.32. Live Aboveground Biomass Carbon Stocks in Tanzanian Forests.

Vegetation Type	AGB[1] t CO2/ha
Forest	102.5
Woodland	47.7
Bushland	19.0
Average	56.4

The 2015 NAFORMA - National Forest Resources Monitoring and Assessment of Tanzania Mainland was the source of information for the area of AVFOR, the forest strata, and the stocks of aboveground biomass carbon present in each stratum.

The area weighted average aboveground tree carbon stock for forests available for unplanned deforestation inside the leakage belt (CLB) was calculated using data found in Section 3.11.

CLB = 68.3 t CO_2e ha-1.

The proportional difference in carbon stocks between areas of forest available for unplanned deforestation both inside and outside the leakage belt (PROPCS) was calculated as PROPCS = 56.4 t CO2-e ha-1 / 68.3 t CO_2e ha-1 = 0.826.

The proportional leakage for areas with immigrating populations was calculated using Equation 3.12. The values for the parameters used in this equation can be found in Table 3.33.

Equation 3.12. Equation for Calculating the Proportional Leakage for Areas with Immigrating Populations.

$$LK_{PROP} = PROP_{IMM} * (1 - PROP_{LB}) * PROP_{CS}$$

[52] Values transformed from NAFORMA data. p48 NAFORMA, Ministry of Natural Resources and Tourism, Tanzania Forest Services Agency, Government of Finland, AND FAO. 2015. NAFORMA - National Forest Resources Monitoring and Assessment of Tanzania Mainland - Main Results.

Table 3.33. Parameters and Values used to Calculate the Proportional Leakage for Areas with Immigrating Populations.

Parameter	Description	Value	Justification/Source
LKPROP	Proportional leakage for areas with immigrating populations; proportion	0.075	
PROPIMM	Estimated proportion of baseline deforestation caused by immigrating population; proportion	0.091	Estimated above
PROPLB	Area of forest available for unplanned deforestation as a proportion of the total national forest area available for unplanned deforestation; proportion	0.0021629	Calculated above
PROPCS	The proportional difference in stocks between areas of forest available for unplanned deforestation both inside and outside the Leakage Belt; proportion	0.826	Calculated above

The net leakage outside the leakage belt (ΔCLK-ASU,OLB) is calculated ex-ante using Equation 3.13. The values for the parameters used in this equation can be found in Table 3.34. Annual values for ΔCLK-ASU,OLB were calculated in Table 3.35.

Equation 3.13. Equation[53] for Calculating the Net CO_2 Emissions due to Unplanned Deforestation Displaced Outside the Leakage Belt.

$$\Delta C_{LK\text{-}ASU,OLB} = \Delta C_{P,LB} - \Delta C_{BSL,LK,unplanned} * LK_{PROP}$$

Table 3.34. Parameters and Values used to Calculate the Net CO_2 Emissions due to Unplanned Deforestation Displaced Outside the Leakage Belt.

Parameter	Description	Value	Justification/Source
ΔCLK-ASU,OLB	Net CO_2 emissions due to unplanned deforestation displaced outside the leakage belt; t CO_2e	Calculated in Table 3.35, below.	

[53] This equation is incorrect in the methodology. Leakage should be calculated as with project emissions minus baseline emissions.

ΔCBSL,LK,unplanned	Net CO_2 equivalent emissions in the baseline from unplanned deforestation in the leakage belt; t CO_2e	See Table 3.28.	Calculated above
ΔCP,LB	Net CO_2 equivalent emissions within the leakage belt in the project case; t CO_2e	See Table 3.30.	Calculated above
LKPROP	Proportional leakage for areas with immigrating populations; proportion	0.075	Calculated above

Table 3.35. Calculation of Net CO_2 Emissions due to Unplanned Deforestation Displaced Outside the Leakage Belt.

Year	ΔCP,LB (t CO2-e)	ΔCBSL,LK,unplanned (t CO2-e)	LKPROP	ΔCLK-ASU,OLB (t CO2-e)
2017	99,654	98,706	0.075	71
2018	165,906	158,341	0.075	567
2019	237,783	217,794	0.075	1,498
2020	368,893	335,996	0.075	2,465
2021	414,787	381,257	0.075	2,513
2022	606,734	561,039	0.075	3,424
2023	614,158	566,750	0.075	3,552
2024	689,166	631,722	0.075	4,305
2025	732,404	663,578	0.075	5,157
2026	678,876	612,902	0.075	4,944

Emissions from Leakage Prevention Activities

Leakage prevention measures do not include the use of fertilizers or the burning of biomass. As such, greenhouse gas emissions as a result of leakage of avoided deforestation activities (GHGLK,E) are assumed to be zero.

Estimation of Total Leakage due to the Displacement of Unplanned Deforestation

The total leakage due to the displacement of unplanned deforestation is estimated in Table 3.36 using Equation 3.14. GHG emissions are not included in the project boundary.

Equation 3.14. Equation for Estimation of Total Leakage due to the Displacement of Unplanned Deforestation.

$$\Delta C_{LK\text{-}AS,unplanned} = \Delta C_{LK\text{-}A\ SU\text{-}LB} + \Delta C_{LK\text{-}ASU\text{-}OLB} + GHG_{LK,E}$$

Table 3.36. Parameters and Values used to Estimate Total Leakage due to the Displacement of Unplanned Deforestation.

Parameter	Description	Value	Justification
ΔCLK-AS,unplanned	Net greenhouse gas emissions due to activity shifting leakage for projects preventing unplanned deforestation Net CO_2 emissions; t CO_2e	See Table 3.37	Calculated
ΔCLK-ASU-OLB	Net CO_2 emissions due to unplanned deforestation displaced outside the leakage belt; t CO_2e	See Table 3.35.	Calculated
ΔCLK-ASU-LB	Net CO_2 emissions due to unplanned deforestation displaced from the project area to the leakage belt; t CO_2e	See Table 3.30.	Calculated.

Table 3.37. Calculation of the Total Leakage due to the Displacement of Unplanned Deforestation.

Year	ΔCLK-ASU-OLB (t CO2-e)	ΔCLK-ASU-LB (t CO2-e)	GHGLK,E (t CO2-e)	ΔCLK-AS,unplanned (t CO2-e)
2017	71	948	0	1,019
2018	567	7,565	0	8,132
2019	1,498	19,988	0	21,486
2020	2,465	32,897	0	35,362
2021	2,513	33,530	0	36,043
2022	3,424	45,695	0	49,119
2023	3,552	47,408	0	50,960
2024	4,305	57,444	0	61,748
2025	5,157	68,827	0	73,984
2026	4,944	65,974	0	70,918
Total	28,496	380,277	0	408,772

3.2.4 Net GHG Emission Reductions and Removals

Uncertainty will be assessed applying module X-UNC.

Uncertainty in the baseline rate, parameter $Uncertainty_{BSL,RATE}$, is equal to zero. Per the X-UNC module, "It is here assumed that there is zero uncertainty in baseline rate of deforestation or degradation where numbers are equal to a long-term average (BL-UP)" as they are for this project.

Total uncertainty in carbon stocks in forest (parameter $Uncertainty_{BSL,SS}$) is equal to combined uncertainty of forest carbon pool stock estimates, calculated using propagation of errors (equation 4 of VM0007 module X-UNC). Parameter $Uncertainty_{BSL,SS}$ is thus calculated to be 22.6% at the 95% confidence level (calculations detailed in Forest Biomass Carbon Inventory Report) for the initial forest inventory.

Uncertainty$_{WRC_BSL,t}$ is zero as this is not a WRC project. Further, Uncertainty$_{REDD_WPS}$ is zero as no ex post estimates of carbon pools or sources will be made. NER$_{REDDERROR,t^*}$ is therefore limited to Uncertainty$_{BSL,SS}$. The results of overall uncertainty calculations are presented below in Table 3.38.

Table 3.38. Summary of uncertainty calculations.

X-UNC Equation Number	5	Part 1, Step 1	6	10
Parameter	Uncertainty$_{BSL,SS}$	Uncertainty$_{BSL,RATE,}$	Uncertainty$_{BSL,t^*}$	NER$_{REDDERROR,t^*}$
Value	22.6%	0.0%	22.6%	22.6%

Estimates of GHG credits eligible for issuance as VCUs were calculated in Table 3.39, below; where

Estimated GHG emission reduction credits =

Baseline emissions, fixed for 10 years at validation minus

Project emissions minus

Leakage minus

Non-permanence Risk Buffer withholding (calculated as a percent of net change in carbon stocks prior to deduction of leakage, see Appendix A).

Note that an uncertainty deductions was applied to the baseline minus project emissions.

Table 3.39. Ex-Ante Estimated of Net Emission Reduction Credits.

Years	ΔCBSL-REDD (tCO2e)	ΔCWPS-REDD (tCO2e)	Adjusted_NERREDD (tCO2e)	ΔCLK-REDD (tCO2e)	Risk buffer (%)	BufferUnplanned (tCO2e)	VCU (tCO2e)
2017	8,283	2,454	5,385	1,019	19%	1,023	3,343
2018	67,247	21,041	42,685	8,132	19%	8,110	26,443
2019	176,183	53,724	113,127	21,486	19%	21,494	70,147
2020	287,224	84,989	186,822	35,362	19%	35,496	115,964
2021	288,864	81,759	191,321	36,043	19%	36,351	118,927
2022	389,837	106,635	261,619	49,119	19%	49,708	162,793
2023	397,592	102,045	273,023	50,960	19%	51,874	170,188
2024	476,805	117,447	331,971	61,748	19%	63,075	207,148
2025	566,907	135,239	398,770	73,984	19%	75,766	249,020
2026	535,748	120,044	384,022	70,918	19%	72,964	240,140

Over the first 10 year baseline period, the project area is expected to result in 2,188,746 tons t CO_2e reductions with a buffer pool contribution of 415,862 t CO_2e and a total expected emission reduction of 1,364,112 t CO_2e after account for leakage (408,772 t CO_2e).

Table 3.40. Emissions Reductions (t CO2-e) Expected to be Generated by the Project over the 10 Year Crediting Period.

Aspect of Emission Reductions Estimate	t CO_2e
Net forest carbon sequestration (t CO_2) (Baseline-With project scenario) adjusted for uncertainty	2,188,746

Buffer pool contribution	415,862
Leakage	408,772
Total Emission Reductions	1,364,112

3.3 Monitoring

3.3.1 Data and Parameters Available at Validation

Data / Parameter:	$\Delta C_{BSL,PA,unplanned}$
Data unit:	**t CO_2-e**
Description:	**Net CO_2 emissions in the baseline from unplanned deforestation in the project area**
Source of data:	**Derived in Section 3.2 of PD**
Value applied:	**Set at start of baseline period**
Justification of choice of data or description of measurement methods and procedures applied:	**Derived and justified in Section 3.2 of PD in which baseline is set**
Purpose of Data	**Calculation of baseline emissions**
Comments	

Data / Parameter:	$\Delta C_{BSL,LK,unplanned}$
Data unit:	**t CO_2-e**
Description:	**Net CO_2 emissions in the baseline from unplanned deforestation in the leakage belt**
Source of data:	**Derived in Section 3.2 of PD**
Value applied:	**Set at start of baseline period**
Justification of choice of data or description of measurement methods and procedures applied:	**Derived and justified in Section 3.2 of PD in which baseline is set**
Purpose of Data	**Calculation of leakage**
Comments	

Data / Parameter:	***CF***
Data unit:	**t C t^{-1} d.m.**
Description:	**Carbon fraction of biomass**
Source of data:	**IPCC 2006GL**
Value applied:	**0.47**
Justification of choice of data or description of measurement methods and procedures applied:	**Global default**

Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter:	C_{OLB}
Data unit:	t CO_2-e ha^{-1}
Description:	Average aboveground tree carbon stock for forests available for unplanned deforestation outside the Leakage Belt
Source of data:	Values transformed from NAFORMA data. p48 NAFORMA, Ministry of Natural Resources and Tourism, Tanzania Forest Services Agency, Government of Finland, AND FAO. 2015. NAFORMA - National Forest Resources Monitoring and Assessment of Tanzania Mainland - Main Results.
Value applied:	56.4 t CO_2-e ha^{-1}
Justification of choice of data or description of measurement methods and procedures applied:	Derived above in Section 3.2 of the PD
Purpose of Data	Calculation of leakage
Comments	

Data / Parameter:	fj(X,Y)
Data unit:	kg d.m. tree-1
Description:	Allometric equation for species j linking measured tree variable(s) to aboveground biomass of living trees.
Source of data:	Data resulting from the forest inventory.
Value applied:	See forest inventory excel workbook.
Justification of choice of data or description of measurement methods and procedures applied:	Mugasha, A. W., Zahabu, E., Mathias, A., Luganga, H., Maliondo, S. M. S., & Malimbwi, R. E. 2016. Chapter 7 Allometric Biomass and Volume Models for Acacia-Commiphora Woodlands. Allometric Tree Biomass and Volume Models in Tanzania, 67.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Comments	

Data / Parameter:	R
Data unit:	**t root d.m. t -1 shoot d.m.**
Description:	**Root to shoot ratio appropriate to species or forest type / biome**
Source of data:	**Data resulting from the forest inventory.**
Value applied:	**0.28**
Justification of choice of data or description of measurement methods and procedures applied:	**Root biomass density was calculated using an IPCC root to shoot ratio of 0.28 for dry tropical forest, as found in the VM-0007 module CP-AB, "Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools".**
Purpose of data	**Calculation of baseline emissions** **Calculation of project emissions**
Comments	**Value documented in VMD0001**

3.3.2 Data and Parameters Monitored

Data / Parameter:	$\Delta C_{P,Def,i,t}$
Data unit:	t CO_2-e
Description:	Net carbon stock change as a result of deforestation in the project case in the project area in stratum i at time t
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every $\leq$ 5 years
Value applied:	Year / ΔCP,DefPA,i,t (t CO2-e) 2017 / 2,355 2018 / 20,195 2019 / 51,565 2020 / 81,573 2021 / 78,474 2022 / 102,349 2023 / 97,944 2024 / 112,727 2025 / 129,804 2026 / 115,220
Monitoring equipment:	None.
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.

Purpose of data	Calculation of project emissions
Calculation method:	Equation 3, VMD0015
Comments	None

Data / Parameter:	$\Delta C_{P,DefLB,i,t}$
Data unit:	t CO_2-e
Description:	Net carbon stock change as a result of deforestation in the project case in the leakage belt in stratum i at time t
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	Year / ΔCP,DefLB,i,t (t CO2-e) 2017 / 889 2018 / 7,058 2019 / 18,693 2020 / 30,848 2021 / 31,559 2022 / 43,123 2023 / 44,947 2024 / 54,612 2025 / 65,565 2026 / 63,079
Monitoring equipment:	None.
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of leakage
Calculation method:	Equation 4, VMD0015
Comments	None

Data / Parameter:	$\Delta C_{P,DistPA,i,t}$
Data unit:	t CO_2-e
Description:	Net carbon stock change as a result of natural disturbance in the project case in the project area in stratum i at time t
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 5 years

Value applied:	<table><tr><th>Year</th><th>ΔCP,DistPA,i,t (t CO2-e)</th></tr><tr><td>2017</td><td>0</td></tr><tr><td>2018</td><td>0</td></tr><tr><td>2019</td><td>0</td></tr><tr><td>2020</td><td>0</td></tr><tr><td>2021</td><td>0</td></tr><tr><td>2022</td><td>0</td></tr><tr><td>2023</td><td>0</td></tr><tr><td>2024</td><td>0</td></tr><tr><td>2025</td><td>0</td></tr><tr><td>2026</td><td>0</td></tr></table>
Monitoring equipment:	None.
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of project emissions
Calculation method:	Equation 20, VMD0015
Comments	None

Data / Parameter:	$A_{DefPA,u,i,t}$
Data unit:	Ha
Description:	Area of recorded deforestation in the project area stratum i converted to land use u at time t
Source of data:	Monitored at each monitoring/verification event through the use of classified satellite imagery
Description of measurement methods and procedures to be applied:	Detailed procedures are provided under monitoring plan description. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every $\leq$ 5 years
Value applied:	See Table 3.11
Monitoring equipment:	ArcGIS
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data / Parameter:	$A_{DefLB,u,i,t}$
Data unit:	Ha
Description:	Area of recorded deforestation in the leakage belt stratum i converted to land use u at time t
Source of data:	Monitored at each monitoring/verification event through the use of classified satellite imagery

Description of measurement methods and procedures to be applied:	Detailed procedures provided under the monitoring plan description. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	See Table 3.12
Monitoring equipment:	ArcGIS
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of leakage
Calculation method:	Not relevant
Comments	None

Data / Parameter:	$A_{DistPA,q,i,t}$
Data unit:	ha
Description:	Area impacted by natural disturbance in post-natural disturbance stratum q in stratum i, at time t
Source of data:	Monitored at each monitoring/verification event through the use of classified satellite imagery
Description of measurement methods and procedures to be applied:	Detailed procedures provided under the monitoring plan description. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	Year / $A_{DistPA,q,i,t}$ 2017 / 0 2018 / 0 2019 / 0 2020 / 0 2021 / 0 2022 / 0 2023 / 0 2024 / 0 2025 / 0 2026 / 0
Monitoring equipment:	ArcGIS
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data / Parameter:	$C_{BSL,i}$
Data unit:	t CO_2-e ha^{-1}

Description:	Carbon stock in all pools in the baseline case in stratum i
Source of data:	Estimated from forest carbon inventory.
Description of measurement methods and procedures to be applied:	Detailed procedures provided under the monitoring plan description Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	Strata: CBSL,i (t CO2-e ha-1) MAS: 54.6 MWF: 99.0
Monitoring equipment:	dbh tape, measuring tape, GPS, clinometer
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Use equations as stated in the forest inventory and section 3.3 of the PD.
Comments	None

Data / Parameter:	$\Delta C_{pools,Def,u,i,t}$
Data unit:	t CO_2-e ha^{-1}
Description:	Carbon stock in all pools in post-deforestation land use u in stratum i
Source of data:	Calculated.
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	0.0
Monitoring equipment:	None.
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Equation 5, VMD0015
Comments	None

Data / Parameter:	$A_{DegW,i,t}$
Data unit:	ha
Description:	Area potentially impacted by degradation processes in stratum i

Source of data:	Delineated based on survey results indicating general area of project potentially accessed and typical depth of penetration of illegal harvest activities from points of access
Description of measurement methods and procedures to be applied:	Detailed procedures provided under the monitoring plan description. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Repeated each time the PRA indicates a potential for degradation. PRA conducted every ≤ 2 years
Value applied:	0
Monitoring equipment:	None.
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description.
Purpose of data	Calculation of project emissions
Calculation method:	Not relevant
Comments	PRAs indicated no degradation

Data / Parameter:	$C_{DegW,i,t}$
Data unit:	t CO_2-e
Description:	Biomass carbon of trees cut and removed through degradation process from plots measured in stratum i at time t
Source of data:	Estimated from diameter measurements of cut stumps in sample plots
Description of measurement methods and procedures to be applied:	Detailed procedures provided under the monitoring plan description. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 5 years where surveys and limited sampling continue to indicate possibility of illegal logging in the project area
Value applied:	0
Monitoring equipment:	None.
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description.
Purpose of data	Calculation of project emissions
Calculation method:	Equation 8, VMD0015
Comments	PRAs indicated no degradation

Data / Parameter:	AP_i
Data unit:	ha
Description:	Total area of degradation sample plots in stratum i
Source of data:	Calculated as 3% of $A_{DegW,i,t}$

Description of measurement methods and procedures to be applied:	Detailed procedures provided under the monitoring plan description. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 5 years where surveys and limited sampling continue to indicate possibility of illegal logging in the project area
Value applied:	To be determined
Monitoring equipment:	ArcGIS
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description.
Purpose of data	Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data / Parameter:	$\Delta C_{P,DegW,i,t}$
Data unit:	t CO_2-e
Description:	Net carbon stock changes as a result of degradation in stratum i in the project area at time t
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 5 years where surveys and limited sampling continue to indicate possibility of illegal logging in the project area
Value applied:	0
Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of project emissions
Calculation method:	Equation 8, VMD0015
Comments	PRAs indicated no degradation

Data / Parameter:	$PROP_{IMM}$
Data unit:	Proportion
Description:	Estimated proportion of baseline deforestation caused by immigrating population
Source of data:	Calculated based on results of survey of communities in the area around the project.
Description of measurement methods and procedures to be applied:	Detailed procedures provided under the monitoring plan description.

	Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	0.091
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of leakage
Calculation method:	Not relevant
Comments	None

Data / Parameter:	*TOTFOR*
Data unit:	ha
Description:	Total available national forest area
Source of data:	Official data, peer reviewed publications, remotely sensed imagery (coarse scale imagery is appropriate) or cadastral maps and other verifiable sources
Description of measurement methods and procedures to be applied:	Procedures provided below under monitoring plan description. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Prior to each verification event and at least every 5 years.
Value applied:	48,090,699
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of leakage
Calculation method:	Not relevant
Comments	Ministry of Natural Resources and Tourism, Tanzania Forest Services Agency, Government of Finland, AND FAO. 2015. NAFORMA - National Forest Resources Monitoring and Assessment of Tanzania Mainland - Main Results.

Data / Parameter:	*PROTFOR*
Data unit:	ha
Description:	Total area of fully protected forests nationally
Source of data:	Official data, peer reviewed publications and other verifiable sources

Description of measurement methods and procedures to be applied:	Procedures provided below under monitoring plan description. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Prior to each verification event and at least every 5 years.
Value applied:	0
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of leakage
Calculation method:	Not relevant
Comments	None

Data / Parameter:	*MANFOR*
Data unit:	ha
Description:	Total area of forests under active management nationally
Source of data:	Official data, peer reviewed publications and other verifiable sources
Description of measurement methods and procedures to be applied:	Procedures provided below under monitoring plan description. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Prior to each verification event and at least every 5 years.
Value applied:	0
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of leakage
Calculation method:	Not relevant
Comments	None

Data / Parameter:	*ARRL,forest,t*	
Data unit:	ha	
Description:	Remaining area of forest in RRL at time t	
Source of data:	Calculated	
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3.	
Frequency of monitoring/recording:	Prior to each verification event and at least every 5 years.	
Value applied:	ARRL,Forest2005	3,126,053

	ARRL,Forest2015 | 2,747,978
Monitoring equipment:	ArcGIS
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of project emissions
Calculation method:	Calculated as the total area of the RRL minus all non-forested areas.
Comments	None

Data / Parameter:	*Aburn,q,i,t.*
Data unit:	ha
Description:	Area burnt in post-natural disturbance stratum q in stratum i, at time t;
Source of data:	See parameter $A_{DistPA,q,i,t}$
Description of measurement methods and procedures to be applied:	Monitored as part of $A_{DistPA,q,i,t}$ Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every $\leq$ 5 years
Value applied:	Year | Aburn,q,i,t. (ha) 2017 | 0 2018 | 0 2019 | 0 2020 | 0 2021 | 0 2022 | 0 2023 | 0 2024 | 0 2025 | 0 2026 | 0
Monitoring equipment:	None.
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of project emissions
Calculation method:	Aburn,q,i,t.= $A_{DistPA,q,i,t}$ (area burnt in natural disturbance)
Comments	None

Data / Parameter:	dbh
Data unit:	cm
Description:	diameter at breast height
Source of data:	Monitored during the course of each forest inventory

Description of measurement methods and procedures to be applied:	Detailed procedures provided below in the SOPs. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	See forest inventory excel sheet.
Monitoring equipment:	dbh tape, measuring tape,
QA/QC procedures to be applied:	Detailed procedures are provided under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data / Parameter:	dbasal
Data unit:	cm
Description:	Basal diameter
Source of data:	Monitored during the course of each forest inventory
Description of measurement methods and procedures to be applied:	Detailed procedures provided below in the SOPs. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	See forest inventory excel sheet.
Monitoring equipment:	dbh tape, measuring tape,
QA/QC procedures to be applied:	Detailed procedures are provided under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	Dbh may be used as a conservative estimate of dbasal

Data / Parameter:	H
Data unit:	m
Description:	Height of tree
Source of data:	Monitored during the course of each forest inventory
Description of measurement methods and procedures to be applied:	Detailed procedures provided in the SOPs. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	See forest inventory excel sheet.
Monitoring equipment:	measuring tape, clinometer

QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data / Parameter:	$U_{P,SS,i,pool\#}$
Data unit:	%
Description:	Percentage uncertainty (expressed as 95% confidence interval as a percentage of the mean where appropriate) for carbon stocks and greenhouse gas sources in the with-project case (1,2…n represent different carbon pools and/or GHG sources)
Source of data:	Calculations arising from field measurement data
Description of measurement methods and procedures to be applied:	Uncertainty in pools derived from field measurement with 95% confidence interval calculated as the standard error of the averaged plot measurements in each stratum multiplied by the t value for the 95% confidence level. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Monitored at least once every 10 years (on re-measurement of forest carbon stocks)
Value applied:	Same as UBSL,SS,i,pool# values below.
Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	Same as UBSL,SS,i,pool# values below as forest carbon stock growth was not tracked.

Data / Parameter:	EBSL SS,i, pool#
Data unit:	t CO2-e
Description:	Carbon stock or GHG sources (e.g. trees, dead wood, soil organic carbon, emission from fertilizer addition, emission from biomass burning etc.) in the baseline case
Source of data:	Calculated

Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	<table><tr><td>Strata</td><td>Live aboveground tree biomass</td><td>Belowground biomass</td><td>Standing dead wood</td></tr><tr><td>MAS</td><td>3,062,053</td><td>857,375</td><td>11,415</td></tr><tr><td>MWF</td><td>2,446,006</td><td>684,882</td><td>44,024</td></tr></table>
Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	Baseline stocks and sources are estimated ex-ante for each baseline period

Data / Parameter:	UBSL,SS,i,pool#
Data unit:	%
Description:	Percentage uncertainty (expressed as 95% confidence interval as a percentage of the mean where appropriate) for carbon stocks and greenhouse gas sources in the baseline case (1,2…n represent different carbon pools and/or GHG sources)
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	<table><tr><td>Strata</td><td>Live aboveground tree biomass</td><td>Belowground biomass</td><td>Standing dead wood</td></tr><tr><td>MAS</td><td>35.5%</td><td>35.5%</td><td>82.3%</td></tr><tr><td>MWF</td><td>45.0%</td><td>45.0%</td><td>115.4%</td></tr></table>
Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	See equation 5 in the X-UNC module.
Comments	Baseline stocks and sources are estimated ex-ante for each baseline period

Data / Parameter:	EBSL SS,i
Data unit:	t CO2-e
Description:	Sum of combined carbon stocks and GHG sources in stratum i multiplied by the area of stratum i (Ai) in the baseline case
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	Strata: EBSL,SS,t,I (tCO2e) MAS: 3,930,843 MWF: 3,174,912
Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	Baseline stocks and sources are estimated ex-ante for each baseline period

Data / Parameter:	UBSL,SS,i
Data unit:	%
Description:	Percentage uncertainty in the combined carbon stocks and greenhouse gas sources in stratum i in the baseline case
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	Strata: UncertaintyBSL,SS,I (%) MAS: 28.7% MWF: 36.1%
Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of baseline emissions Calculation of project emissions

Calculation method:	See equation 5 in the X-UNC module.
Comments	Baseline stocks and sources are estimated ex-ante for each baseline period

Data / Parameter:	Bi,t	
Data unit:	tonnes d. m. ha-1	
Description:	Average aboveground biomass stock before burning stratum i,time t	
Source of data:	Calculated using forest inventory data	
Description of measurement methods and procedures to be applied:	Detailed forest inventory procedures are provided in the SOPs. Monitoring responsibilities are listed in section 3.3.	
Frequency of monitoring/recording:	Every ≤ 10 years	
Value applied:	Bi,t (tonnes d.m./ha) Ex-ante Project Area	31.0
	Bi,t (tonnes d.m./ha) Ex-ante Leakage Belt	31.0
Monitoring equipment:	None	
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.	
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage	
Calculation method:	Use equations in the forest inventory.	
Comments	Ex-ante Bi,t is the weighted average across all strata	

Data / Parameter:	AGB
Data unit:	tonnes d. m. ha-1
Description:	Aboveground biomass density
Source of data:	Calculated using forest inventory data
Description of measurement methods and procedures to be applied:	Detailed forest inventory procedures are provided in the SOPs. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	Plot level values can be found in the Forest Inventory Report
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Use equations as stated in the forest inventory.
Comments	None

Data / Parameter:	Asp

Data unit:	ha
Description:	Area of sample plots in ha
Source of data:	Recording and archiving of number and size of sample plots
Description of measurement methods and procedures to be applied:	Detailed forest inventory procedures are provided in the SOPs. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	See forest inventory report.
Monitoring equipment:	m
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data / Parameter:	Hsdw
Data unit:	m
Description:	Height of standing dead tree in m
Source of data:	Monitored during the course of each forest inventory
Description of measurement methods and procedures to be applied:	Detailed procedures provided below in the SOPs. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	See forest inventory excel workbook.
Monitoring equipment:	measuring tape, clinometer
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data / Parameter:	DDWdc
Data unit:	t d.m. m-3
Description:	Mean wood density of dead wood in the density class (dc) – sound (1),intermediate (2), and rotten (3); t d.m. m-3
Source of data:	Harmon, M. E., Woodall, C. W., Fasth, B., Sexton, J., & Yatkov, M. (2011). Differences between standing and downed dead tree wood density reduction

	factors: a comparison across decay classes and tree species.
Description of measurement methods and procedures to be applied:	Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	<table><tr><td>Density Class</td><td>Density (t d.m. m-3)</td></tr><tr><td>Rotten (P)</td><td>0.250</td></tr><tr><td>Intermediary (I)</td><td>0.350</td></tr><tr><td>Solid (S)</td><td>0.380</td></tr></table>
Monitoring equipment:	dbh tape, measuring tape, drying oven
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data / Parameter:	CP,Dist,q,i
Data unit:	t CO2-e ha-1
Description:	Carbon stock in all pools in post-natural disturbance q in baseline stratum i
Source of data:	Monitored
Description of measurement methods and procedures to be applied:	Procedures provided in section 3.3 of the PD. Monitoring responsibilities are listed in section 3.3.
Frequency of monitoring/recording:	Prior to each verification event and at least every 5 years.
Value applied:	<table><tr><td>Year</td><td>CP,Dist,q,i (t CO2-e)</td></tr><tr><td>2017</td><td>0</td></tr><tr><td>2018</td><td>0</td></tr><tr><td>2019</td><td>0</td></tr><tr><td>2020</td><td>0</td></tr><tr><td>2021</td><td>0</td></tr><tr><td>2022</td><td>0</td></tr><tr><td>2023</td><td>0</td></tr><tr><td>2024</td><td>0</td></tr><tr><td>2025</td><td>0</td></tr><tr><td>2026</td><td>0</td></tr></table>
Monitoring equipment:	dbh tape, measuring tape, GPS, clinometer
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of project emissions
Calculation method:	None

Comments	It can be conservatively assumed that a post-natural disturbance live and dead vegetation stock is equal to zero

Data / Parameter:	Ai
Data unit:	ha
Description:	Total area of stratum i
Source of data:	GIS coverages
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	<table><tr><td>Strata in Project</td><td>Ai (ha)</td></tr><tr><td>MAS</td><td>71,990</td></tr><tr><td>MWF</td><td>32,075</td></tr></table> <table><tr><td>Strata in LB</td><td>Ai (ha)</td></tr><tr><td>MAS</td><td>71,940</td></tr><tr><td>MWF</td><td>32,075</td></tr></table>
Monitoring equipment:	ArcGIS
QA/QC procedures to be applied:	Detailed procedures provided under the monitoring plan description
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Calculation method:	N/A
Comments	*Ex-ante,* it shall be assumed that stratum area will remain constant for the baseline period

3.3.3 Monitoring Plan

This monitoring plan has been developed to be consistent with module VMD0015 of the REDD Methodological Module, "Methods for monitoring of greenhouse gas emissions and removals (M-MON)." This section focuses on establishing procedures for monitoring deforestation, illegal degradation, natural disturbance, and project emissions ex-post in the project area and leakage belt. Further, procedures for updating the forest carbon stocks and revising the baseline are also provided below.

For accounting purposes, the project conservatively assumes stable stocks and no biomass monitoring is conducted in areas undergoing carbon stock enhancement, as permitted in the methodology monitoring module VMD0015, hence $\Delta C_{P,Enh,i,t}$ is set to 0.

Further as no commercial harvest of timber (including FSC selective logging) occurs in the baseline or with project case, the degradation due to harvest of timber will not be monitored, thus parameter $\Delta C_{P,SelLog,i,t}$ is set to 0.

A separate section on quality assurance/quality control and data archiving procedures covers all monitoring tasks.

Organizations responsible for monitoring are listed below in Table 3.46. These organizations are responsible for implementing all aspects of a particular monitoring task, as described in the monitoring sub-sections below.

Estimation of ex-post net carbon stock changes and greenhouse gas emissions

Ex-post net carbon stock changes and greenhouse gas emissions can only be calculated after monitoring:

- The net carbon stock change as a result of deforestation in the project area;
- The net carbon stock change as a result of degradation in the project area;
- The net carbon stock change as a result of natural disturbance in the project area; and
- The greenhouse gas emissions as a result of deforestation and degradation activities within the project area.

Monitoring Deforestation and Natural Disturbance

Forest cover change due to deforestation and natural disturbance is monitored through periodic assessment of classified satellite imagery, see below, covering the project area. Emissions ($\Delta C_{P,Def,i,t}$ and $\Delta C_{P,DistPA,i,t}$ for deforestation and natural disturbance, respectively) are estimated by the multiplying areas $A_{DefPA,u,i,t}$ and $A_{DistPA,q,i,t}$,, for deforestation and natural disturbance, respectively, by average forest carbon stock per unit area. Note that $A_{DistPA,q,i,t}$,, is limited to the area where credits have been issued and is identified as the overlap between the delineated area of the disturbance and the summed area of unplanned deforestation in the project area to the year in which the disturbance occurred. Stock estimates from the initial field inventory completed in 2017, are valid for 10 years (per VM0007). Table 3.41 shows the data and parameters monitored.

Table 3.41. Data and Parameters for Monitoring Deforestation and Natural Disturbance.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
$\Delta C_{P,Def,i,t}$	Net carbon stock change as a result of deforestation in the project case in the project area in stratum i at time t	t CO_2e	Calculated
$\Delta C_{P,DistPA,i,t}$	Net carbon stock change as a result of natural disturbance in the project case in the project area in stratum i at time t	t CO_2e	Calculated
$A_{DefPA,u,i,t}$	Area of recorded deforestation in the project area stratum i converted to land use u at time t	Ha	Monitored for each verification event
$A_{DistPA,q,i,t}$	Area impacted by natural disturbance in post-natural disturbance stratum q in stratum i, at time t	Ha	Monitored for each verification event
$C_{BSL,i}$	Carbon stock in all pools in the baseline case in stratum i	t CO_2e ha^{-1}	Estimated from the forest carbon inventory
ARRL,forest,t	Remaining area of forest in RRL at time t	Ha	Updated prior to each verification event

Changes in forest cover ($A_{DefPA,u,i,t}$ and $A_{DistPA,q,i,t}$) will be monitored using classified Landsat imagery. Landsat 1G imagery products which are both radiometrically and geometrically corrected will be used, and converted to reflectances using the solar elevation angle parameter in the MTL text file and DN Haze parameter which is calculated from the raw imagery. Each image will then be processed separately using hard classification techniques with a combination of supervised and clustering approaches. Areas of known land cover types (forest, bushlands, grasslands, agriculture) will be used to develop training sites for a supervised classification. To reduce cloud and shadow coverage, multiple images from each scene may be combined. All land cover types are combined into forest and non-forest groups for each Landsat scene, and then all scenes are combined to complete coverage of the full reference region. Once all scenes are combined, a mode filtering procedure will be used whereby, a 3 x 3 pixel filter will be used to increase the minimum mapping unit to 0.81 ha. (90m x 90m).

In the case, where this dataset ceases to be available, ex-post deforestation will be determined by classification of remotely sensed imagery and alternate land use change detection procedures.

The project area (and leakage belt boundary), as set in the PD, will serve as the initial "forest cover benchmark map" against which changes in forest cover will be assessed over the interval of the first monitoring period; the entire project area has been demonstrated to meet the forest definition at the beginning of the crediting period. For subsequent monitoring periods, change in forest cover will be assessed against the preceding classified forest cover map marking the beginning of the monitoring interval. Thus, the forest benchmark map is updated at each monitoring event. The area of remaining forest in the RRL (ARRL,forest,t) is derived by subtracting the nonforested area within the RRL, as found in the forest benchmark map (updated at each monitoring event), from the total area of the RRL.

Monitoring Illegal Degradation

Emissions due to illegal logging will be tracked by conducting surveys in the surrounding areas every two years. Locations surveyed will include:

- Families residing in the WMA directly adjacent to the project area; and
- Nearby villages and rural lands, outside of the WMA approaching the project area.

Surveys will produce information on wood consumers (fuel wood , wood for construction, and charcoal production) in the surroundings areas, as well as general indications on the areas where wood is sourced from and maximum depth of penetration of harvest activities from access points.

In the event that any potential of illegal logging occurring in the project area is detected from the surveys (i.e. ≥ 10% of those interviewed/surveyed believe that degradation may be occurring within the project boundary), temporary sample plots will be allocated and measured in the area of the project indicated by the surveys as a potential source area for illegally-harvested wood. The potential degradation area within the project area ($A_{DegW,i}$) will be delineated based on survey results, incorporating general area information and maximum depth of penetration. Rectangular plots 10 meters by 1 kilometer (1 ha area) will be randomly or systematically allocated in the area, sufficient to produce a 1% sample of the area, and any recently-cut stumps or other indications of illegal harvest will be noted and recorded. Diameter at breast height, or diameter at height of cut, whichever is lower, of cut stumps will be measured.

In the event that the sample plot assessment indicated that illegal logging is occurring in the area, supplemental plots will be allocated to achieve a 3% sample of the area. Biomass will be estimated from measured diameters (conservatively assuming that diameters of stumps cut below breast height are equivalent to diameter at breast height) applying the allometric equations of Mugasha et al. 2016[54] and otherwise maintain consistency with analytical procedures applied in the original forest inventory report. Emissions due to illegal logging ($\Delta C_{P,DegW,i,t}$) are estimated by multiplying area ($A_{DegW,i}$) by average biomass carbon of trees cut and removed per unit area ($C_{DegW,i,t} / AP_i$).

[54] Mugasha, A. W., Zahabu, E., Mathias, A., Luganga, H., Maliondo, S. M. S., & Malimbwi, R. E. 2016. Chapter 7 Allometric Biomass and Volume Models for Acacia-Commiphora Woodlands. Allometric Tree Biomass and Volume Models in Tanzania, 67

The more intensive 3% sample will be carried out once every 5 years where surveys and limited sampling continue to indicate possibility of illegal logging in the project area to produce an estimate of emissions resulting from illegal logging ($\Delta C_{P,DegW,i}$). Estimates of emissions will be annualized (to produce estimates in t CO_2e per year) by dividing the emission for the monitoring interval by the number of years in the interval.

Table 3.42. Data and Parameters for Monitoring Illegal Degradation.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
$A_{DegW,i,t}$	Area potentially impacted by degradation processes in stratum i	Ha	Delineated based on survey results indicating general area of project potentially accessed and typical depth of penetration of illegal harvest activities from points of access
$C_{DegW,i,t}$	Biomass carbon of trees cut and removed through degradation process from plots measured in stratum i at time t	t CO_2e	Estimated from diameter measurements of cut stumps in sample plots
AP_i	Total area of degradation sample plots in stratum i	Ha	Calculated as 3% of $A_{DegW,i,t}$
$\Delta C_{P,DegW,i,t}$	Net carbon stock changes as a result of degradation in stratum i in the project area at time t	t CO_2e	Calculated

Monitoring Project Emissions

With project emissions are calculated as the sum of emission from fossil fuel combustion (EFC,i,t) + non-CO_2 emissions due to biomass burning (EBiomassBurn,i,t) + direct N_2O emissions as a result of nitrogen application (N2Odirect-N,i,t.). As stipulated in the methodology, fossil fuel combustion in all situations is an optional emission source. Further, no nitrogen is applied on alternative land uses in the with project case and hence project emissions therefore equal EBiomassBurn and are calculated using the VMD0013, "Estimation of greenhouse gas emissions from biomass burning (E-BB)" of the AD Partners modular REDD Methodology.

Non CO_2 emissions from biomass burning in the project case include emissions from burning associated with deforestation and burning associate with natural disturbance, i.e. forest fire. It will be conservatively assumed that the total area burnt during the deforestation process is equal to the area deforested, ADefPA,u,i,t. Thus, the area used when calculating E-BB is equal to Aburn,i,t. (area burnt) = Aburn,q,i,t. (area burnt in natural disturbance) + ADefPA,u,i,t (area burnt via deforestation in project ex post)."

Also, it is conservatively assumed that burning is a part of the forest conversion process in all incidents of deforestation taking place in the leakage belt. Thus, for deforested strata in the leakage belt, parameter $A_{burn,i,t}$ (Area burnt for stratum i at time t; ha) will be set equal to monitored parameter $A_{DefLB,i,t}$ (Area of recorded deforestation in the leakage belt at time t; ha). The T-SIG tool can then be applied, and if

parameter $E_{BiomassBurn,t}$ (Greenhouse emissions due to biomass burning as part of deforestation activities in stratum *i* in year *t*) is determined to be insignificant, $E_{BiomassBurn,t}$, can be assumed equal to zero.

Table 3.43. Data and Parameters for Monitoring Emissions from Biomass Burning.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
E BiomassBurn,t	Greenhouse emissions due to biomass burning as part of deforestation activities in stratum i in year t	tCO_2e of each GHG (CH_4, N_2O)	Calculated
Aburn,i,t	Area burnt for stratum i at time t	Ha	Monitored for each verification event
Bi,t	Average aboveground biomass stock before burning stratum i, time t	tonnes d. m. ha-1	Conservatively assumed to be the carbon stock in all pools in the baseline case (CBSL,i).
COMF i	Combustion factor for stratum i; dimensionless	dimensionless	0.45 for primary open tropical forest. Derived from Table 2.6 of IPCC, 2006.
Gg,i	Emission factor for stratum i for gas g	kg t-1 dry matter burnt	GCH_4 = 6.8 g kg-1 and GN_2O = 0.2 g kg-1. Derived from Table 2.5 of IPCC, 2006.
GWPg	Global warming potential for gas g	t CO_2/t gas g	Default values from IPCC SAR: CH_4 = 21; N_2O = 310).

Monitoring of leakage carbon stock changes and greenhouse gas emissions

Leakage by local agents of deforestation is quantified in the leakage belt. The area deforested in the leakage belt (ADefLB,i,t) is estimated in the same manner as the area deforested in the with project case ($A_{DefPA,u,i,t}$) using the procedures outlined above in the monitoring deforestation section. Activity shifting leakage within the leakage belt (ΔCLK-ASU-LB) is then calculated as the with project emissions in the leakage belt (ΔCP,LB) minus the baseline emissions in the leakage belt (ΔCBSL,LK,unplanned).

Table 3.44. Data and Parameters for Monitoring Activity Shifting Leakage.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
ΔCP,LB	Net greenhouse gas emissions within the leakage belt in the project case	t CO_2e	Calculated
ADefLB,i,t	Area of recorded deforestation in the leakage belt at time t	ha	Monitored for each verification event

$\Delta C_{P,Def,i,t}$	Net carbon stock change as a result of deforestation in the project case in the project area in stratum i at time t	t CO_2e	Calculated

Immigrant leakage is calculated using a series of equations found in the LK-ASU module. Most of the data for calculating immigrant leakage has been derived for the ex-ante estimates (including ΔCBSL,LK,unplanned; AVFOR; TOTFOR; PROTFOR; MANFOR; PROPLB; LBFOR; COLB; CLB; PROPCS; and ABSL,PA,unplanned,t) or gathered in the course of monitoring activity shifting leakage within the leakage belt and deforestation in the project area (including ADefPA; ADefLB,i,t; and ΔCP,LB).

The monitoring parameters MANFOR, PROTFOR, TOTFOR will be sourced from official data, peer reviewed publications or other verifiable sources and these monitoring parameters will be updated on review of current literature at least every 5 years. Demonstration that managed and protected forests will be protected against deforestation will further be demonstrated, as stipulated in the LK-ASU module.

Monitoring immigrant leakage will therefore consist of implementing surveys in communities living within 2 kilometers of the boundaries of the leakage belt and project area to determine what proportion of the agents of deforestation have been resident in and around the leakage belt and project area for ≥ 5 years (PROPRES) and the proportion of area deforested by population that has migrated into the area in the last 5 years (PROPIMM). As it is extremely sensitive to ask explicit questions regarding responsibility for deforestation, "the proportion of area deforested by population that has migrated into the area in the last 5 years" is assumed to be equal to the percentage of recent immigrants among local population with potential access to the project area (i.e. without directly asking if they are deforestation agents). Similarly, the "proportion of baseline deforestation caused by population that has been resident for ≥ 5 years" is assumed to be equal to the percentage of the local population residing in the area longer than 5 years with potential access to the project area.

Table 3.45. Data and Parameters for Monitoring Immigrant Leakage.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
PROPIMM	Proportion of area deforested by immigrant agents in the leakage belt and project area	proportion	Monitored prior to each verification event and at least every 5 years
PROPRES	Proportion of baseline deforestation caused by population that has been resident for ≥5 years	proportion	Monitored prior to each verification event and at least every 5 years
TOTFOR	Total available national forest area	ha	Monitored prior to each verification event and at least every 5 years
PROTFOR	Total area of fully protected forests nationally	ha	Monitored prior to each verification event and at least every 5 years
MANFOR	Total area of forests under active management nationally	ha	Monitored prior to each verification event and at least every 5 years

Monitoring of actual carbon stock changes and greenhouse gas emissions

Forest carbon stock estimates will be derived from field measurements less than or equal to 10 years old. Aboveground and belowground live tree and dead wood stocks will be re-assessed on or before 2027. For each stratum, where the re-measured estimate is within the 90% confidence interval of the t=0 estimate, the t=0 stock estimate takes precedence and is re-employed, and where the re-measured estimate is outside (i.e. greater than or less than) the 90% confidence interval of the t=0 estimate, the new stock estimate takes precedence and is used for the subsequent period.

Sample plots will be randomly located in areas within the project area and measured following standard operating procedures. Biomass will be estimated applying the following allometric equations and otherwise maintain consistency with analytical procedures applied in the original inventory ("Forest biomass carbon inventory for the Makame Project, Kiteto District, Tanzania," 2017).

For live trees, biomass was calculated as a function of diameter at breast height (DBH; in cm) using the predictive model developed by Mugasha et al.[55] in the Kiteto District (n=50 trees, R-squared=0.98).

Equation 3.15: aboveground biomass (kg) = 0.1879*(dbh)^2.2904

Root biomass density was calculated using an IPCC[56] root to shoot ratio of 0.28 for dry tropical forest, as found in the VM-0007 module CP-AB, "Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools".

Biomass of standing dead wood in the decomposition class 1 is estimated using the allometric equation for live trees. In decomposition class 2, the estimate of biomass was limited to the main trunk (bole) of the tree, converting volume of the bole to biomass using dead wood density classes. Volume of bole was estimated as the volume of a cone, as specified in the VM0007 module CP-D, "Estimation of carbon stocks in the dead wood pool". The density of dead wood classes was sourced from Harmon et al.[57].

Dry mass was converted to carbon using the default carbon fraction of 0.47 t C/t d.m. (as recommended by IPCC[58] Guidelines for National Greenhouse Gas Inventories).

Revision of the Baseline

The baseline will be revised every 10 years from the project start date.

Data collection procedures in regards to revision of the baseline will include participatory rural appraisals and interviews with municipal officials. Deforestation maps will be prepared by classifying remotely sensed imagery. Other datasets used to substantiate aspects of the baseline with be from official government sources, peer reviewed publications, or other reputable sources.

Quality Assurance/Quality Control and Data Archiving Procedures

Monitoring Deforestation, Natural Disturbance, and Leakage

To ensure consistency and quality results, spatial analysts carrying out the imagery processing, interpretation, and change detection procedures will strictly adhere to best practices and good practice guidelines, when using the alternative method for quantifying deforestation. All data sources and analytical procedures will be documented and archived (detailed under data archiving below).

Accuracy of the classification will be assessed by comparing the classification with ground-truth points or samples of high resolution imagery. Any data collected from ground-truth points will be recorded (including

[55]See Mugasha, A. W., Zahabu, E., Mathias, A., Luganga, H., Maliondo, S. M. S., & Malimbwi, R. E. 2016. Chapter 7 Allometric Biomass and Volume Models for Acacia-Commiphora Woodlands. Allometric Tree Biomass and Volume Models in Tanzania, 67

[56] IPCC 2003 Good Practice Guidance for Land Use, Land-Use Change and Forestry

[57] Harmon, M. E., Woodall, C. W., Fasth, B., Sexton, J., & Yatkov, M. (2011). Differences between standing and downed dead tree wood density reduction factors: a comparison across decay classes and tree species.

[58] IPCC 2006 Guidelines for National Greenhouse Gas Inventories. Chapter 4 AFOLU (Agriculture, Forestry and Other Land-use).

GPS coordinates, identified land-use class, and supporting photographic evidence) and archived. Any sample points of high resolution imagery used to assess classification accuracy will also be archived. Samples used to assess classification accuracy should be well-distributed throughout the project area (as far as is possible considering availability of high resolution imagery and/or logistics of acquiring ground-truth data), with a minimum sampling intensity of 50 points each for the forest and non-forest classes.

The classification will only be used in the forest cover change detection step if the overall classification accuracy, calculated as the total number of correct samples / the total number of samples, is equal to or exceeds 90%.

All data sources and processing, classification and change detection procedures will be documented and stored in a dedicated long-term electronic archive.

Information related to monitoring deforestation maintained in the archive will include:

- Forest / non-forest maps;
- Documentation of software type and procedures applied (including all pre-processing steps and corrections, spectral bands used in final classifications, and classification methodologies and algorithms applied), if applicable; and
- Data used in accuracy assessment - ground-truth points (including GPS coordinates, identified land-use class, and supporting photographic evidence) and/or sample points of high resolution imagery.

Forest Carbon Stocks and Degradation

The following steps will be taken to control for errors in field sampling and data analysis:

1. Trained field crews will carry out all field data collection and adhere to standard operating procedures. Pilot sample plots shall be measured before the initiation of formal measurements to appraise field crews and identify and correct any errors in field measurements. Field crew leaders will be responsible for ensuring that field protocols are followed to ensure accurate and consistent measurements. To ensure accurate measurements, the height of diameter at breast height (1.3 m) will be periodically re-assessed by personnel during the course of the inventory.
2. Field measurement data will be recorded on field data sheets and entered into an excel database for data management and quality control. Potential errors in data entry (anomalous values) will be verified or corrected consulting the original data sheets or personnel involved in measurement. Original data sheets will be permanently archived in a dedicated long-term electronic archive. The electronic database will also archive GIS coverages detailing forest and strata boundaries and plot locations.

Quality control procedures for sampling degradation will include steps 1 and step 2, above where warranted.

Quality control procedures related to monitoring leakage include conducting a review of the current literature at least every 5 years to source information on the area of the monitoring parameters MANFOR, PROTFOR, and TOTFOR. Further, participatory rural appraisals used to assess the length of time people have been living in the project area and leakage belt will be implemented by personnel with experience conducting community surveys.

Personnel involved in the revising of the baseline will have detailed knowledge in regards to spatial modeling and land use change and deep familiarity with REDD methodologies. Remote sensing data used will include officially published dataset, or classified imagery, which meets accuracy assessment requirements as laid out in the methodology.

All measurement and monitoring equipment requiring calibration will be calibrated according to the equipment's specifications and/or relevant national or international standards.

Data Archiving

Data archived will be maintained through at least two years beyond the end of the project crediting period. All project records are secure and retrievable. This includes project documents saved on the desktop of the Director of Carbon Tanzania and stored in the Director's file cabinets (based in Arusha, Tanzania). An

identical version of the project documents are remotely saved on an external hard drive and in the cloud via DropBox. Furthermore, many project documents (e.g., VCS Project Description, Monitoring Reports, CCBS Project Design Document, Project Implementation Reports, Validation and Verification Reports, etc.) are publicly available and stored on both the Standards' website and on the Markit Environmental Registry. Given the extended time frame and the pace of production of updated versions of software and new hardware for storing data, electronic files will be updated periodically or converted to a format accessible to future software applications, as needed.

Organization, Responsibilities, and Monitoring Frequency

For all aspects of project monitoring, project staff will ensure that data collection, processing, analysis, management and archiving are conducted in accordance with the monitoring plan.

Table 3.46. Type of Monitoring and Party Responsible for Monitoring.

Variables to be monitored	Responsible	Frequency
Monitoring deforestation and natural disturbance	Carbon Tanzania	Prior to each verification
Monitoring illegal degradation	Carbon Tanzania	Every two years
Monitoring project emissions	Carbon Tanzania	Prior to each verification
Activity shifting immigrant leakage assessment	Carbon Tanzania	Prior to each verification event and at least every 5 years.
Updating forest carbon stocks estimates	Carbon Tanzania	At least every 10 years.
Revision of the baseline	Carbon Tanzania	At least every 10 years.

3.3.4 Dissemination of Monitoring Plan and Results (CL4.2)

Carbon Tanzania will share a summary of the monitoring plan and results with the communities through the WMA. These documents also will be made publicly available on the internet for the communities, other stakeholders, and all those concerned. Summaries will also be kept at the WMA office where communities can access them. In addition, Carbon Tanzania will hold sessions with our partners in the landscape to explain the monitoring plan and any results and further explain how they may affect their roles and responsibilities vis-a-vis the project.

3.4 Optional Criterion: Climate Change Adaptation Benefits

3.4.1 Regional Climate Change Scenarios (GL1.1)

Climate change and variability analysis using Climate Wizard[59] will be conducted to forecast future climate change scenarios in five community wildlife management areas in the northern Tanzania rangelands (Burunge, Enduimet, Lake Natron Basin, Makame, and Randilen) and four districts (Kiteto, Monduli / Longido, and Simanjiro) in Northern Tanzania. The analysis will project over the next 50 and 100 years. This analysis will be produced using a set of 9 General Circulation Model (GCM) projections from the World Climate Research Programme's (WCRP's) Coupled Model Intercomparison Project phase 3 (CMIP3). The Climate Wizard was developed to calculate 22 "derivative climate metrics" that are calculated from

[59] Girvetz, E. H., Zganjar, C., Raber, G. T., Maurer, E. P., Kareiva, P., & Lawler, J. J. (2009). Applied climate change analysis: The climate Wizard tool. *PLoS ONE*, *4*(12)

projections of both temperature and rainfall.[60] These climate change scenarios will have an impact on availability of grazing for both pastoralist Masai and wildlife. This regional assessment is further supported by multiple national studies referenced in a synopsis by USAID[61] and articulated in the Tanzanian National Climate Change Strategy[62]. In all cases the recognition of supporting the planning and protection of indigenous habitat for livestock and wildlife.

3.4.2 Climate Change Impacts (GL1.2)

Climate change creates a major threat and uncertainty that has and will continue to add to the challenge of ensuring healthy and resilient socio-economic and ecological systems in the northern Tanzanian landscape. Many of these changes are threatening the landscape's ability to continue to provide integrated grazing lands for pastoralists and seasonal habitat for wildlife. Climate change research allows us to predict a range of climatic changes to help us improve resilience. Climate resilience is the capacity to absorb shocks and maintain function in response to external climate related stresses. It means adapting and reorganizing to improve the sustainability of the system to be better prepared for future climate change impacts. Increasing climate resilience amongst pastoralist involves improving governance structures, land and natural resource management through seasonal resource zone planning and ensuring water availability at the end of the dry season.

3.4.3 Measures Needed and Designed for Adaptation (GL1.3)

Carbon Tanzania in partnership with The Nature Conservancy plans to conduct a detailed analysis of climate change scenarios and impacts within the northern Tanzania region as well as specifically to Makame WMA (see section 2.1). This research will allow us to predict a range of climatic change scenarios, helping us to inform communities and improve resilience, which in this context means adapting and reorganizing specific threats to pastoralist communities and ensuring these communities are better prepared for future climate change impacts. Increasing climate resilience involves improving governance, land and natural resource management, livelihoods practices and critically for the pastoralist Masai and wildlife, mobility across the landscape. In this context, mobility for both grazing and access to water for cattle and wildlife during the dry season. A community analysis of climate change impacts aims at increased awareness of district staff, village governments, community members and Non-Governmental Organization (NGO) staff - on projected climate change impacts in Northern Tanzania. This analysis Identifies immediate threats and will aim to identify and rank observed threats based on climate change information and therefore Identify and implement realistic adaptation strategies.

The results of these climate change models will be presented to the communities at the community climate change workshop scheduled for September 2016 (see G1.8). Combined with the identified threats by communities, the data will be used to inform the Makame WMA resource Zone Management Plan. This plan is designed to provide for planned seasonal grazing in Makame WMA. Development of dams for water storage for both livestock and wildlife. In addition, protecting indigenous habitat and rangeland is recognised as a strategic objective in the National Climate Change Stratergy[62].

[60] NTRI EENT Climate Change Report Final.
[61] www.climatelinks.org/sites/default/files/asset/document/tanzania_adaptation_fact_sheet_jan2012.pdf
[62] http://tanzania.um.dk/en/~/media/Tanzania/Documents/Environment/TANZANIA%20CLIMATE%20CHANGE%20STRATEGY/TANZANIA%20CLIMATE%20CHANGE%20STRATEGY.pdf

4 COMMUNITY

4.1 Without-Project Community Scenario

4.1.1 Descriptions of Communities at Project Start (CM1.1)

The historical co-existence between pastoralists and wildlife is in rapid transition. The human population in northern Tanzania's Manyara and Arusha Regions grew from 2.3 million in 2002 to 3.1 million in 2012 (+35%)[63]. Agriculture in the EENT focal area[64] expanded from 60,000 hectares in 2000 to 127,100 hectares in 2015 (+112%), and the establishment of nationally protected areas in the Masai Steppe resulted in local evictions and a history of conflict between community interests and conservation objectives[65]. An increasing number of men have left rural areas in the Simanjiro Plains, north of the Makame REDD project area to seek jobs in towns, and women in the total population shifted from being 1.6% less women than men in 2002 to being 2.2% more women than men in 2012 in the project districts of Kiteto, as well as neighbouring districts of Longido, Monduli and Simanjiro[6667].

These recent changes undermine the landscape's ability to continue to sustain integrated grazing lands for pastoralists and seasonal habitat for wildlife. Many wildlife populations are in decline, and despite the shift towards community-based conservation through Wildlife Management Areas, wildlife tourism, and other approaches, local people frequently have higher costs than benefits from the wildlife and protected areas. However, due to its remoteness, the inhabitants of Makame WMA are subject to less influence from the outside than other regions in the Northern Tanzania Rangelands Initiative (NTRI) project area, leaving them more strongly tied with Masai traditions.

Throughout the Makame WMA the large majority of inhabitants are Maa speaking Masai (93% of household heads are Masai). Their subsistence relies on the traditional practice of keeping livestock, which along with agriculture, provides their main source of food and income. Very few inhabitant's own businesses or are employed. The other ethnicities which inhabit the area come from the surrounding tribes of Irangi, Gogo and Barabaig and are generally monogamous and practicing agriculture.

The Masai are polygamists that gain wives through providing a bride price of cows, which is relatively high in the Makame region at approximately 10-15 cows. They live in complex arrangements. Defining the household is challenging in the Masai context because there is no direct translation of 'household' in Maa. In Masai areas, a boma or homestead is known as an enkang. Within the enkang, a household is called an olmarei (plural ilmareita), and there can be multiple ilmareita in an enkang. Each olmarei can have multiple sub-households known as inkajijik (singular enkaji)[68]. The household (olmarei) is usually comprised of a married man and his wives, and sometimes dependents, e.g., the mother (or mother-in-law) of the male head. Each wife has her own house (enkaji), and the husband may move between the houses, have his own separate home, or mainly stay in one of the inkajijik. There may also be multi-location households with residences in both the village and a town. Dependents of the male head can form inkajijik within his olmarei.

The enkaji forms a semi-independent unit within the olmarei and is normally responsible for providing for its members, although sharing of work and resources among inkajijik takes place. Female-headed ilmareita also exist, mostly formed by widows. These usually consist of a single enkaji, but there can be more if one of the wives of a deceased olmarei head becomes the head for all inkajijik in the olmarei. On average throughout Makame, each olmarei (household) has two wives, and men are on average 13.8 years older than their wives. The population is very young, with 52% aged under 15 and only 3-4% above 65 years old.

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[63] National Bureau of Statistics (2012). Population and Housing Census, Tanzania.
[64] Endangered Ecosystems Northern Tanzania, USAID funded project covering the NTRI area of northern Tanzania. https://www.ntri.co.tz
[65] Igoe, J. and Brockington, D., 1999. *Pastoral land tenure and community conservation: A case study from north-east Tanzania*. London, UK: IIED.
[66] National Bureau of Statistics (2002). Population and Housing Census, Tanzania.
[67] National Bureau of Statistics (2012). Population and Housing Census, Tanzania.
[68] *Coast, E. (2000). Masai demography. Doctoral dissertation, University of London, University College London.*

The hierarchy within the Masai community is based on clusters of males in different age groups, of which their wives become a part of upon marriage. Young boys are traditionally entrusted with herding the cows or other livestock from a very young age. A circumcision ceremony sees them pass into warrior status (Morans) for which certain rules apply. The responsibility of a warrior is to protect their village and its livestock from wild animals or hostile outsiders, a task which has lost some of its relevance in modern times and therefore it is common for warriors to travel. Whilst it is uncommon to marry during this time they may have "secret" girlfriends. Finally, a ceremony sees that cohort of young men become elders. Within this group there are the more junior and senior elders, based on age. Within this patriarchal society, the male elders make the decisions for all members of the Masai community[69].

Makame hosts both the lowest standard of living in the region and the greatest food insecurity score, which is a seasonal issue. This probably reflects that it is the most traditionally Masai and pastoralist area in the region. It must also be considered that it is the area with the largest livestock herds (which is not considered in these scores). Notably the food insecurity score is significantly greater for women. A major hindrance to well-being lies in the average of 32 hours per week it takes to collect water in the dry season, and 12 hours per week in the wet. Additionally, 6 hours per week are spent collecting firewood, which 98% of respondents use as their fuel for cooking. Healthwise, it is common for people to experience fever and illness with a cough, but malaria has affected just 6% of the population over the past 12 months and AIDS is barely evident.

The homes in Makame are constructed predominantly of traditional materials, that is walls of mud/dung, floors of clay/mud and rooves of leaves or mud. Just 2% of homes contain a toilet on a concrete slab and 8% have metal roofs. The education levels are generally quite poor, yet improving with the younger generation. Whilst 72% of respondents over 18 had none or pre-primary school education, currently 49% of boys and 39% of girls are attending primary school.

Socio-economic status among the Masai in Makame is somewhat difficult to gauge. The society operates with cattle as the main currency. Being poor or rich is based on the size of one's herd, and herds are growing and shrinking constantly. Those without cattle sometimes adopt a life-style that includes gathering of wild foods and honey, depending heavily on forest resources. However, to obtain a wife a Masai must pay a dowry in cattle, and it is said the community will often come together to provide cattle for those who cannot provide themselves. This acts as a societal safety net for the most disadvantaged members of the community.

In terms of agriculture, the major crops produced are maize, sesame, beans and sunflowers. The distribution of landholding size is quite different throughout the households, with the majority holding 5-10 acres. Additionally, 90% of households own livestock, predominantly cows, goats, chickens, sheep and donkeys. In Masai households, livestock and especially cattle are owned by the olmarei head. He will assign a number of cattle to each of his wives who have the milking rights of these animals, which is the main source of income in traditional Masai culture. Issues arise from wildlife attacks on livestock and damage to crops, which seem to be increasing. It is also extremely hard to get livestock or produce to market.

Four women and four men were interviewed in Makame about what they do each hour of the day during the wet season. From this the below Activity Clocks were created, giving an indication of the daily practices of the people. The women do an average of 10 activities a day and 7 of these involve physical work. The men do an average of 8 activities a day but only 2 of these involve physical work.

[69] *ibid*

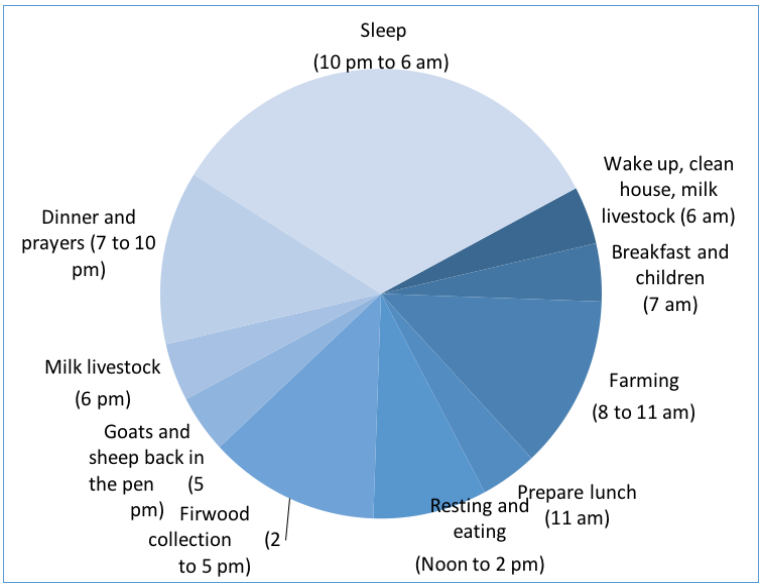


Figure 4.1.1.a. Women's daily activity clock in the wet season

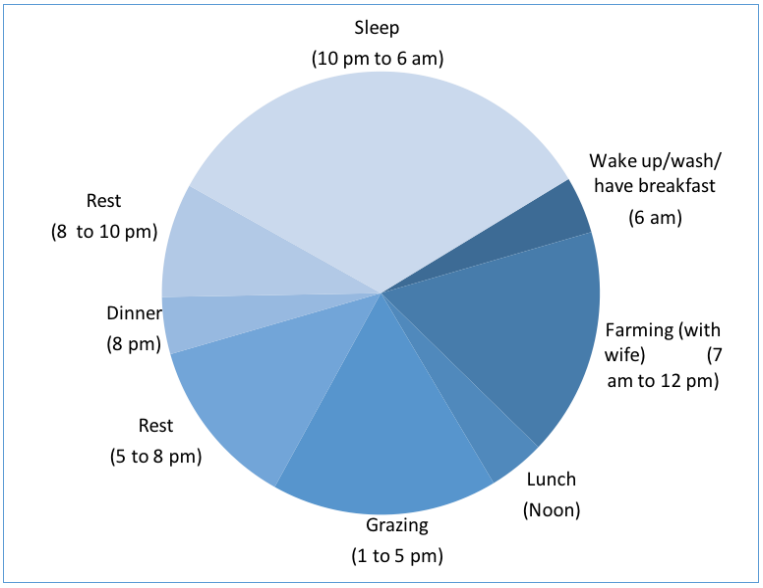


Figure 4.1.1.b. Men's daily activity clock in the wet season

Regarding religion, the traditional Masai mythology seems to have been predominantly replaced by different forms of Christianity. A few older members of the community may still practice their traditional beliefs, honouring the trees, mountains and water sources, whilst most others practice Christianity. They are predominantly Lutheran and Roman Catholics.

Overall the people value cows above all else, gaining respect from the community through the quantity of healthy cows they possess. They believe they have a good life and are happy with the way that society functions, incorporating their highly valued traditions. Not owning cows is perceived as failure in life, in which case the community will usually assist the poor by providing subsistence.

4.1.2 Interactions between Communities and Community Groups (CM1.1)

Community Group	Interactions with the community
Women	The women hold a clear role in the community and the boma (cooking, cleaning, raising children etc.). It is unusual for a woman to step outside of this role. Women participate in village decision making through attendance at village assembly meetings, where older women are afforded greater respect. The women are not represented in village or WMA governance structures. They feel that men are unaware of all that they do; and desire more respect for their voices and their rights. Each village has a woman's group, composed of elected members from each sub-village. They meet and receive training regarding governance, civic rights, land rights and leadership etc. Generally women are married in their late teens or early 20's to an older man.
Children	There is a gender and an age based power structure. Therefore the children must respect their elders, as respect comes with age. This is a period of learning, either in school or from their elders. Responsibility is handed down quite young to assist with life in the boma.
Warriors (Young Men)	The warriors must respect their elders. Within tradition they have little opportunity to voice their opinions or participate in decision making processes. However, it is possible for youth to hold political positions of power. The young warriors strongly value the Masai tradition and desire its maintenance whilst simultaneously progressing forward with the knowledge gained through their school education. They are generally unmarried and spend a lot of time amongst themselves, both inside the community and traveling outside.
Male Elders	This group leads the community, making higher-level decisions and holding responsibility. Greater age equals greater respect. They resolve conflicts within the community. They compose the village and WMA governance.
Pastoralists	91% of Makame community members are practising pastoralism as a livelihood. It is the most respected occupation within the community and undermines the entire organisation of the community. More cows afford you more respect.
Agriculturists	If you run a farm as a business and do not simultaneously own livestock, the community perceives this to be an inadequate occupation and hence pure agriculturalists are disrespected. However most of the agriculturalists are farming alongside owning livestock, which is well regarded. There is not much of a market for the produce within the villages, so a lot of it is transported out and sold in other villages.
Non-Masai	In general the Masai do not like the outsiders living within the community, however the village council may grant them land or they may work on the land of a Masai within the human settlement zones. Masai will often hire the labour of other ethnic groups for agricultural purposes or for other hard labour.
Other Stakeholders	Elected Village Government forms the centre of legal decision making, the village chairman is also involved in the AA of the WMA. An elected village government is not represented in district government structure. The village is represented through though a ward councillor elected by all village members.
District Government	Have a legal role to play in jurisdictional governance of the district. Located in Kibaya, the district capital. Resources are limited therefore interactions with the communities are also limited.

4.1.3 High Conservation Values (CM1.2)

High Conservation Value	***Acacia-commiphora woodland / Grazing lands for livestock***
Qualifying Attribute	*The woodland that dominates the landscape, outside of residential zones, is crucial in providing grazing habitat for the cows, which are integral to the community in providing their main source of food and income, as well as comprising the major element of their cultural identity.*
Focal Area	*This woodland encompasses most of the project area and is at the core of the activities involved in this conservation project.*
High Conservation Value	*Water source – for livestock*
Qualifying Attribute	*Again the livestock encompasses the communities cultural well-being and supports their livelihoods, without year-round water sources for livestock the community would not exist.*
Focal Area	*Various locations throughout the project area as well as settlement areas*
High Conservation Value	*Water source – for people*
Qualifying Attribute	*The environment can be extremely dry and void of drinking water sources which is obviously crucial for the survival of the people. In the dry season women can walk many hours to fetch water.*
Focal Area	*Each village has its known water sources, varying from taps to wells or springs. Some sources will dry up in the dry season.*
High Conservation Value	*Indigenous Medicines (Forest)*
Qualifying Attribute	*Masai medicines are well known and used widely amongst the people. This encompasses a large element of their culture, tradition and well-being.*
Focal Area	*The medicines are derived from a variety of trees and plants throughout the woodland.*
High Conservation Value	*Churches*
Qualifying Attribute	*The community practices different branches of Christianity, using the village churches to gather and practice their religion. Churches are important both for their spiritual satisfaction and for bringing the community together.*
Focal Area	*Each village contains one or more churches.*

4.1.4 Without-Project Scenario: Community (CM1.3)

Throughout the Conservation Action Planning (CAP) workshop, stakeholders identified threats and their contributing factors that are affecting the overall targets of the project, using The Nature Conservancy's

CAP methodology[70]. This situational analysis provides a good indication of the likely future of the community given the 'without-project' scenario as it focuses specifically on the current and future situation around those targets if the project were not to be introduced. The *contributing factors* detail influences on the current situation and the *threats* represent the intermediate outcomes in the absence of the project. Based on this analysis a set of situational diagrams outlines the expected 'without-project' scenario in Makame WMA (See Figure 4.1.4.a / 4.1.4.b / 4.1.4.c).

In the absence of the project the resource management plan of the WMA would not be well-enforced, due to lack of funding and capacities within leadership. This would be of detriment to the community in many ways, particularly regarding the livelihoods of their cattle. Two major contributing factors to the communities' unstable futures lie in the rapid population expansion occurring in the region, and the effects of climate change, both increasing pressures on the resource. Without the project, we would likely see:

Conflicts over pasture for livestock: land conversion from forest to agriculture would continue and accelerate, as would over-grazing and land degradation (traditionally the nomadic Masai would move when land became degraded), all of which contribute to reducing suitable grazing areas for livestock. The threat from drought, fire or invasion of community lands would only exacerbate the situation, negatively impact the well-being of all community groups through the resultant conflicts, unavailability of pasture for their livestock and consequential impacts. Subsequent cattle deaths (as occurred after the 2016 drought) lead to food insecurity. In the event of insufficient pasture, community members may begin adopting new livelihood practices outside of pastoralism, leading to the deterioration of culture and tradition. Cattle form the backbone of this community and without addressing the pressures from climate change, land encroachment and resource management, this Masai community could struggle to maintain its way of life.

Weak governance: the enforcement of the resource management plan would be extremely difficult given the availability of funding and current capacities of the WMA. In the 'without-project' scenario one would find increased poaching activities resulting in losses to the hunting tourism industry; environmental degradation causing negative impacts on erosion, Masai medicines and ecosystem services such as water; lack of accountability/transparency within leadership bodies creating distrust and tension within the community; ongoing ignorance to the resource management plan and its zones ensuring lack of cohesion in land use practices; land encroachment around WMA borders resulting in conversion of forest to agriculture and reduced grazing lands for livestock.

The above changes would directly and/or indirectly cost all community groups. These changes would be exacerbated into the future given the large cohort of youth that will soon invest their livelihoods in livestock and require grazing lands. Additionally, with population growth at ~3%, and the effects of climate change, pressures are likely to increase resource scarcity.

[70] Conservation Action Plan workshop report Makame WMA, August 2016.

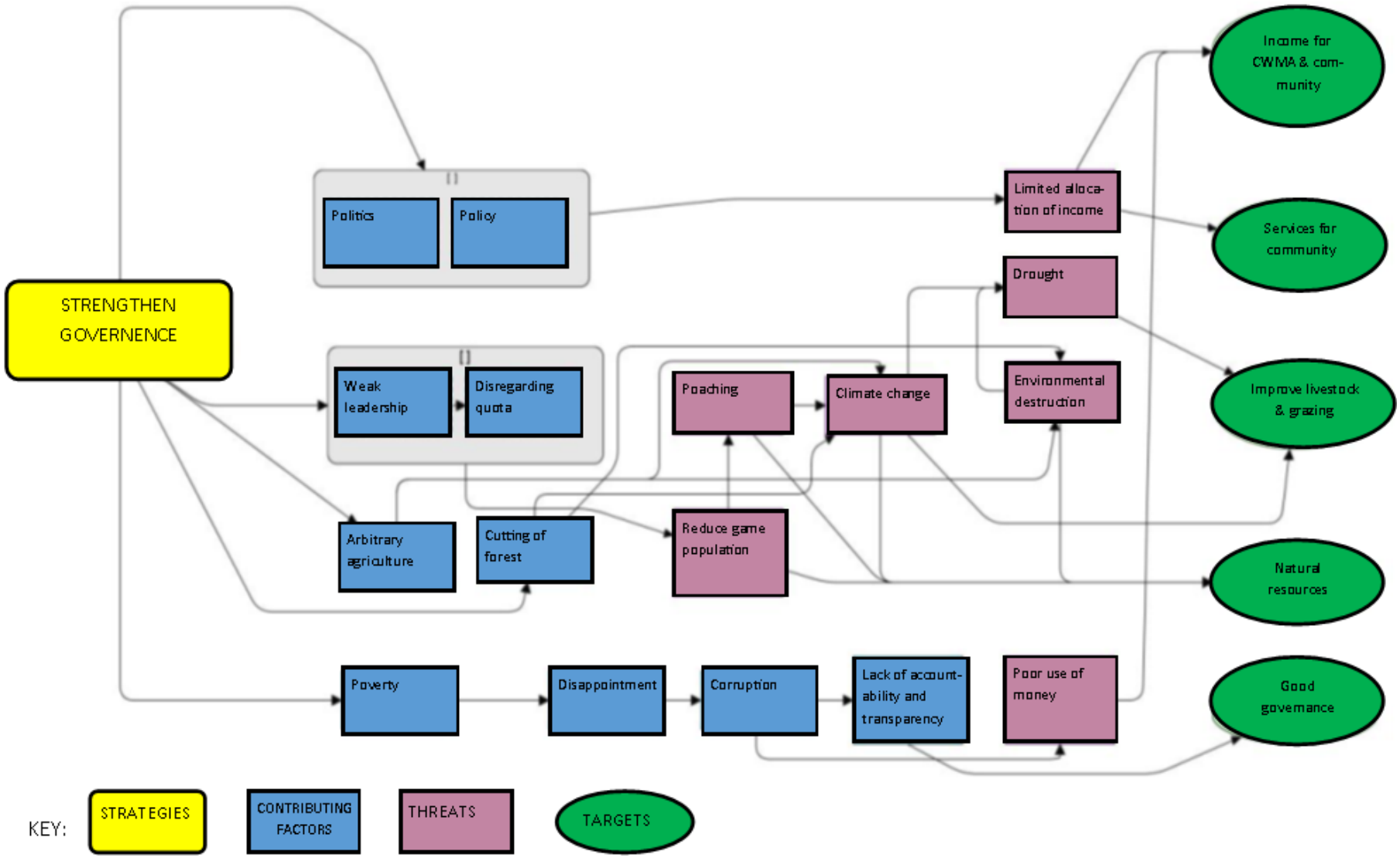
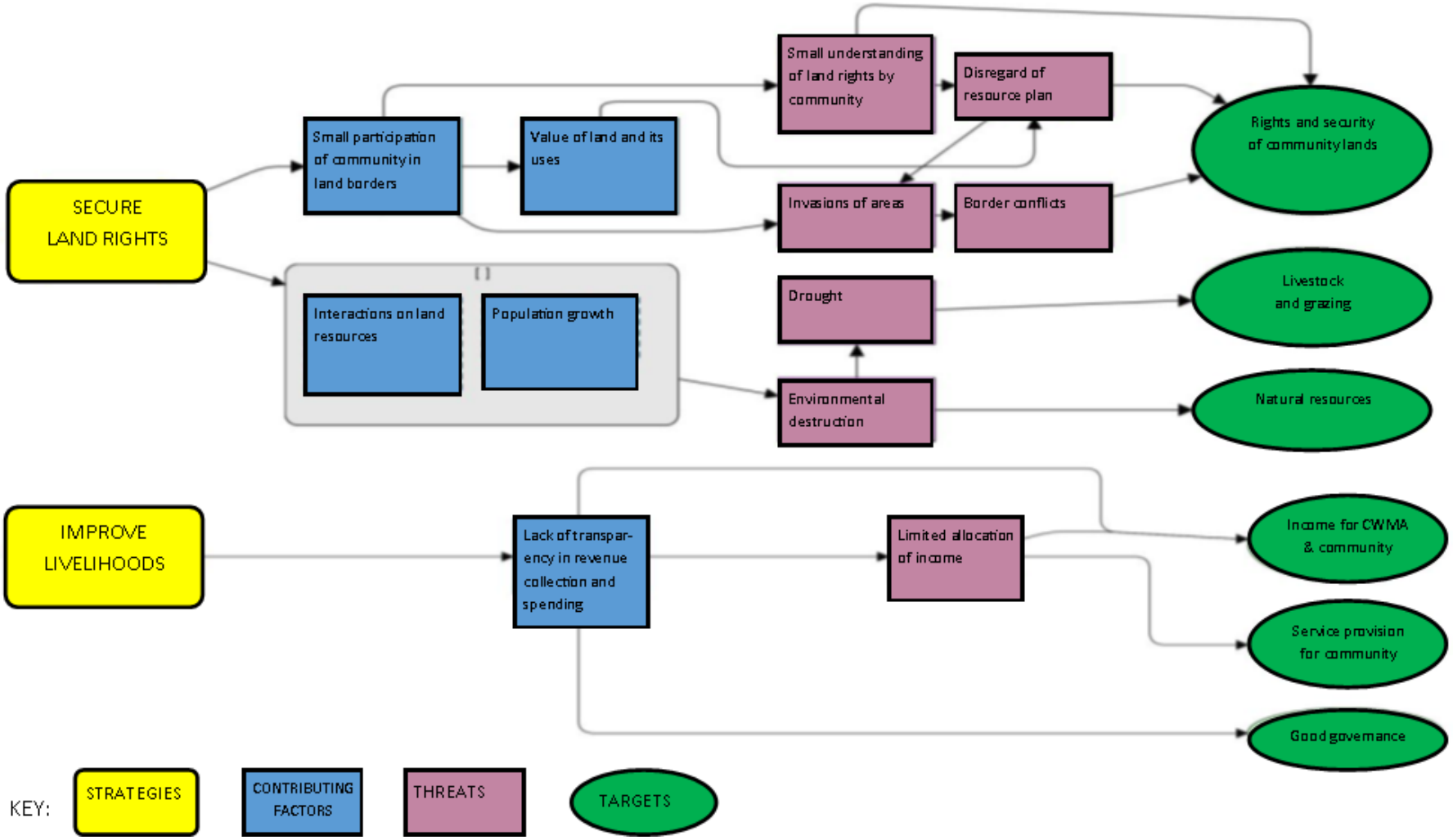


Figure 4.4.1.a: Makame WMA situational diagram - Strengthen Governance (adapted from Swahili

Figure 4.1.4.b.Makame WMA situational diagram – Secure Land Rights and Improve Livelihoods (adapted from Swahili)



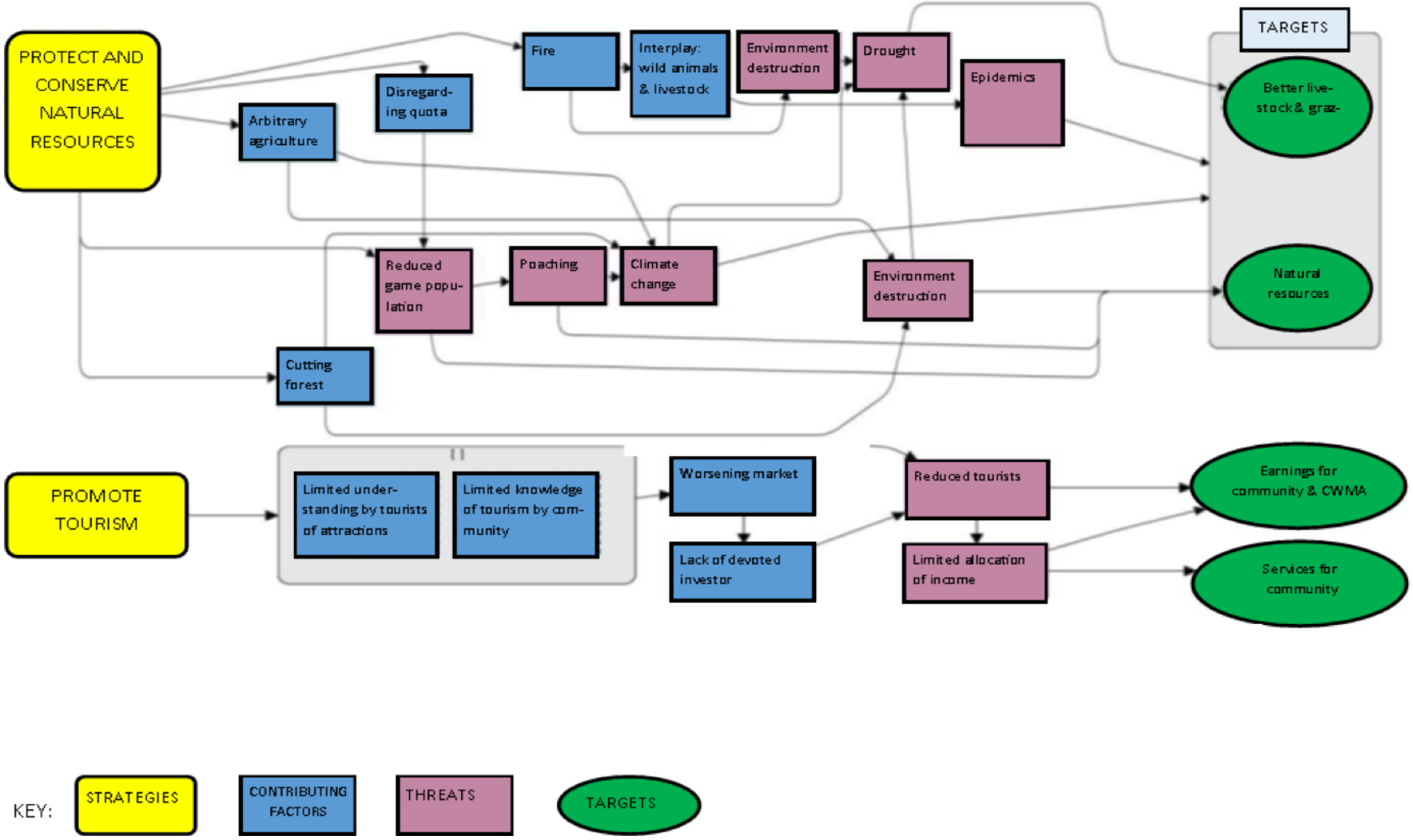


Figure 4.1.4.c. Makame WMA situational diagram – Protect and Conserve Natural Resources, Promote Tourism

4.2 Net Positive Community Impacts

4.2.1 Expected Community Impacts (CM2.1)

Reference: Based on Makame Savannah REDD Theory of Change.

Community Group	*ALL GROUPS*
Impact	*Increased transparency of community income and expenditure*
Type of Benefit/Cost/Risk	*Predicted, indirect benefit*
Change in Well-being	*Improved confidence in leadership and the dissemination of community funds; empowerment of community members over community finances; increased efficiency in community development projects and improved service provision leading to improved quality of life and well-being, greater community cohesion, resilience and stability*
Impact	*Strengthened governance, resource management plan and land rights*
Type of Benefit/Cost/Risk	*Predicted, indirect benefit*
Change in Well-being	*Overall better management of society and resource/land use leading to improved service provision; greater trust and confidence in the government; security in land rights; successful implementation of the land use plan leading to improved livelihoods*
Impact	*Increased resilience of the landscape/resource*
Type of Benefit/Cost/Risk	*Predicted, direct benefit*
Change in Well-being	*Enhanced security and resilience of livelihoods in the face of climate change*
Impact	*Improvements to community infrastructure including roads, water sources, education facilities and health care centres*
Type of Benefit/Cost/Risk	*Predicted, direct benefit*
Change in Well-being	*Increased ease of access to crucial services; decreased time spent fetching water or traveling to places; improved well-being; heightened level of education throughout the community*
Impact	*Increased awareness of conservation and the environment*
Type of Benefit/Cost/Risk	*Predicted, indirect benefit*
Change in Well-being	*Better productivity and condition of the forest resource and ecosystem services it provides (medicinal plants, reduced dust levels, reduced erosion, prevention of siltation of water holes and dams, sustainability of resources creates security in livelihoods*
Impact	*Development of tourism industry*
Type of Benefit/Cost/Risk	*Predicted, direct/indirect benefit*
Change in Well-being	*Increased employment/business opportunities; diversification of income sources; increased community resilience; source of revenue*

	for community development enhancing well-being; improved provision of ecosystem services
Impact	*Sustainability of natural resource*
Type of Benefit/Cost/Risk	*Predicted, indirect benefit*
Change in Well-being	*Enhanced security of, and confidence in, the future of their society and livelihoods*
Impact	*Increased frequency of human-wildlife conflicts*
Type of Benefit/Cost/Risk	*Predicted, direct risk*
Change in Well-being	*Increased negative attitudes toward wildlife; increased insecurity of people in the landscape*
Community Group	***Women***
Impact	*Improvements to village water sources*
Type of Benefit/Cost/Risk	*Predicted, direct benefit*
Change in Well-being	*Availability of more time in the day when they are walking less distance to fetch water; less physical strain when they are carrying the water home themselves*
Impact	*Improved access to and quality of education services*
Type of Benefit/Cost/Risk	*Predicted, direct benefit*
Change in Well-being	*Receiving quality education can empower young women to have more choice about their future, rather than accepting their traditional role in society; increased opportunity to be employed, to continue studies at a higher level or to create their own business opportunities*
Impact	*Improved pasture for livestock*
Type of Benefit/Cost/Risk	*Predicted, indirect benefit*
Change in Well-being	*Improved quality and quantity of produce from livestock; improved food security; more opportunities for income by selling milk or meat; greater potential to own more cows*
Impact	*Incorporation of women into leadership positions*
Type of Benefit/Cost/Risk	*Actual, direct/indirect benefit*
Change in Well-being	*Consideration of female views into decision making; empowerment of women and increased gender equality throughout the community*
Community Group	***Children / Youth***
Impact	*Improved access to and quality of education services*
Type of Benefit/Cost/Risk	*Predicted, direct benefit*

Change in Well-being	*Empowerment of children and youth to have more choice about their future, rather than accepting their traditional role in society; increased opportunities to be employed, to continue studies at a higher level or to create their own business opportunities*
Impact	*Improved pasture for livestock*
Type of Benefit/Cost/Risk	*Predicted, indirect benefit*
Change in Well-being	*Improved quality and quantity of produce from livestock, ensuring greater food security; easier access to pasture and reduced tension/conflict when herding livestock*
Community Group	*Warriors (Young Men)*
Impact	*Improved pasture for livestock*
Type of Benefit/Cost/Risk	*Predicted, indirect benefit*
Change in Well-being	*Improved quality and quantity of produce from livestock, ensuring greater food security and income for themselves and their families; easier access to pasture and reduced tension/conflict when herding livestock; greater potential to own more cows*
Impact	*Increased wildlife*
Type of Benefit/Cost/Risk	*Predicted, direct cost/risk*
Change in Well-being	*As it is the warriors' responsibility to defend against wildlife attacks, it is this sub-group that takes on the risk of facing potentially fatal interactions with wild animals; increased negative attitudes toward wildlife*
Community Group	***Male Elders***
Impact	*Improved pasture for livestock*
Type of Benefit/Cost/Risk	*Predicted, indirect benefit*
Change in Well-being	*Improved quality and quantity of produce from livestock, ensuring greater food security and income for themselves and their families; easier access to pasture and reduced tension/conflict when herding livestock; greater potential to own more cows*
Community Group	*Pastoralists*
Impact	*Increased attacks on livestock from wildlife*
Type of Benefit/Cost/Risk	*Predicted, indirect cost/risk*
Change in Well-being	*Loss of livestock results in decreased produce and assets, costing the pastoralist financially; additional emotional costs as Masai can hold particular cows to be extremely important, treating them like pets who are part of the family; food insecurity; increased negative attitudes toward wildlife*

Impact	*Increased sustainability and resilience of pastoralism*
Type of Benefit/Cost/Risk	*Predicted, direct benefit*
Change in Well-being	*Increased security in livelihood; increased food security; improved well-being*
Impact	*Improved water quality for livestock*
Type of Benefit/Cost/Risk	*Predicted, indirect benefit*
Change in Well-being	*Healthier livestock ensure enhanced psychological well-being; increased food security; increased security in livelihood*
Impact	*Improved pasture for livestock*
Type of Benefit/Cost/Risk	*Predicted, indirect benefit*
Change in Well-being	*Improved quality and quantity of produce from livestock, ensuring greater food security and income for themselves and their families; easier access to pasture and reduced tension/conflict when herding livestock; greater potential to own more cows*
Community Group	*Agriculturalists (Non-Masai)*
Impact	*Increased crop damage from wildlife*
Type of Benefit/Cost/Risk	*Predicted, indirect cost*
Change in Well-being	*Financial losses; food insecurity; decreased resilience; reduced confidence in livelihoods; increased negative attitudes toward wildlife*
Impact	*Reduced land availability for agriculture*
Type of Benefit/Cost/Risk	*Actual, indirect cost*
Change in Well-being	*Reduced possibility to expand agriculture*

4.2.2 Negative Community Impact Mitigation (CM2.2)

Regarding the risk of increased damage to crops for the agriculturalists of Makame WMA, the project partners will collaborate with an experienced local NGO, Honeyguide. This organisation specialises in helping communities to deter wildlife from damaging crops, and from returning in the future, through chili fences and using spotlights, bullhorns, and roman candles. They are effectively teaching community members to conditioning elephants and other wildlife to stay out of their farmlands by creating negative associations. This effort complements a well-crafted resource management plan that deliberately endeavours to separate wildlife from agricultural areas. The plan requires farmlands to be located around human settlements, away from the regions where wildlife is known to frequent.

In terms of the reduced land availability for agriculture, the resource management plan has specifically ensured that there is ample land available within the Human-Settlement/Agriculture Zone (Makazi) for agricultural expansion. The conservation of the project area will have no negative impact on agricultural expansion in the Makame WMA. The implementation of the RMP and setting aside of different land types aims to prevent any perceived land-use change, land grabbing, and land conflict that could arise during the course of the project.

These efforts are designed to be consistent with the precautionary principle, as they proactively aim to prevent negative impacts on the community that might occur as a result of the project.

4.2.3 Net Positive Community Well-Being (CM2.3, GL1.4)

The main goal of this project is to assist the community in the implementation of the resource management plan that they themselves developed, in order to formalise their traditional land management techniques. This, along with the use of the revenue generated from the climate benefits created through the project, has been designed to generate social and economic benefits for the whole community, including marginalised or vulnerable groups. Based on the costs and risks identified in the 'without project' scenario (see Section 4.1.4), as opposed to the numerous benefits to all community groups outlined in the theory of change given the implementation of the project (see Section 4.2.1), it is confidently anticipated that the project will provide net positive well-being impacts for all identified community groups.

Furthermore, this project has considered the anticipated impacts of climate change, which have underpinned the revision of the resource management plan and several other project activities. The following elements of the project will assist with community adaptation to climate change impacts:

- Tourism: creates an income source that is not directly dependent on climate. If there is a year of particularly unusual weather cycles that seriously damage crops or wildlife, income may still be generated from tourism activities.

- Protection/conservation of natural resources: By protecting the forest this project is maintaining the health of the ecosystem which contributes to rangeland health, connectivity of landscape, ecosystem resilience and adaptive capacity. As this resource is fundamental to pastoralism, it is essential to maintain its health so that it may withstand the pressures of climate variability.

- Supporting traditional grazing practices & implementation of resource management plan: channel indigenous community land practices to achieve the above results (underpinned by good governance and secure land rights)

4.2.4 High Conservation Values Protected (CM2.4)

The main goal of this project is to assist the community in the implementation of the resource management plan which formalises their traditional land management techniques and customs. Therefore, it is not anticipated that the project will have a negative impact on any of the project area's High Conservation Values. The project is designed to protect and conserve these areas from misuse, enhance community understanding of their value and to improve overall community well-being.

4.3 Other Stakeholder Impacts

4.3.1 Impacts on Other Stakeholders (CM3.1)

Potential and actual positive impacts that the project activities are likely to cause on the well-being of other stakeholders (District Government) include:

- increased capacity of local government in relation to conflict resolution, participatory forest and wildlife conservation, village land use planning, conservation agriculture and environmental education
- increased awareness on issues ranging from forest conservation, agriculture, land tenure and improving village governance as a result of awareness raising activities
- percentage revenue from carbon sales and an understanding of Payments for Environmental Services or specifically REDD projects

4.3.2 Mitigation of Negative Impacts on Other Stakeholders (CM3.2)

It is not anticipated that the project will have any negative impacts on the well-being of the other stakeholders. Project was designed with input from all stakeholders including district government and aims to support the implementation of the resource management plan which also incorporated the needs of other stakeholders.

4.3.3 Net Impacts on Other Stakeholders (CM3.3)

As shown in 4.3.1 and 4.3.2, the project is anticipated to generate positive impacts on the other stakeholders and no negative impacts, hence leaving a net positive impact overall.

4.4 Community Impact Monitoring

4.4.1 Community Monitoring Plan (CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

The theory of change was the basis for selecting indicators to use for long term community monitoring. We then decided on the best methods to use to collect this data, keeping in mind the desire for accuracy, precision, cost effectiveness and simplicity. From this, a monitoring plan was designed to collect information on the identified indicators. Meetings minutes, finance sheets, attendance records, employment registries and resource management plans were some of the tools chosen to support assessing the indicators. We believe that measuring natural resource availability and access impacted by the conservation-focused activities will provide insight into the effects on the major community-related HCV areas of pasture and traditional medicine sources as identified in the RMP. Improved governance, rights and access to resources such as pasture, traditional medicine, and wild honey along with the employment of games scouts, and increased availability of management and development funds should support resilience and adaptation ability in the communities going forward and thus is crucial for monitoring. A full community monitoring plan and guideline is available as well, as a supporting document. The project's social impact assessment will be conducted using the following framework, which also highlights which indicators relate to monitoring of HCVs;

Area	Objective	Activities	Term	Indicator/ Output	Data Collection Method/Tool	Frequency of Monitoring	Responsible to Monitor
Education	Increase community understanding of natural resource management and the project	Carbon Champions Program	2017-	# People reached # People tested for knowledge	Records of meetings/ interactions Testing results	Bi-annual	Carbon Tanzania
	Increased education opportunities in the WMA	Increased education budget	2020-	Funds available for education	Financial details	Annually	WMA
Governance Management	Improved management of WMA	Train WMA leaders in good governance	2016-	# trainings # people trained	Meeting records	Annually	Carbon Tanzania
		Train local government leaders in good governance	2016-	# trainings # people trained	Meeting records	Annually	Carbon Tanzania
		Implementation and awareness training for resource management plan and business plan	2018 2023 2028	Did training happen? # trained	Training records	Every 5 years	Carbon Tanzania
		Increased budget for management activities	2020-	Funds available for management	Financial details	Annually	WMA
	Creation/Renewal of management frameworks	Creation/Renewal of WMA resource management plan	2017 2022 2027	Existence of WMA resource management plan	WMA resource management plan	Every 5 years	WMA

		Creation/Renewal of WMA business plan	2018 2023 2028	Existence of WMA business plan	WMA business plan	Every 5 years	Carbon Tanzania & WMA
	Increased/ Maintained natural resource management infrastructure	Addition of solar electricity, radio communications and internet access to WMA infrastructure	2018	Implemented or not	Proof of implementation	Every 5 years	Carbon Tanzania
Employment/ Income/ Livelihood	Increased control of resources	Allocate and maintain community grazing area (*HCV*)	2017 2022 2027	Resource management plan	Resource management plan	Every 5 years	WMA
		Non-timber (including carbon, medicine, honey) rights (*HCV*)	2017 2022 2027	Resource management plan	Resource management plan	Every 5 years	WMA
	Improved community livelihoods	Employment of village game scouts	2018-	# people registered as village game scouts # people employed as village game scouts	Registry/payment sheets	Annually	WMA
		Increased village budgets for development	2020-	Funds available for villages	Financial details	Annually	WMA
Women's Empowerment	Formal women's empowerment	Formation of regularly meeting women's forums in WMA member villages	2017-	# of forums # of forum members	Meeting records	Annually	Ujamaa Community Resource Team

	Female representation in WMA leadership	Women in leadership positions in WMA	2017-	# of women in leadership positions	WMA leadership records	Annually	WMA
Carbon Tanzania - Community Relations	Formal relations structure	Appeals and complaints committee	2017	# of appeals and complaints logged	Appeals and complaints log	Annually	Carbon Tanzania & WMA
	Informal relations structure	Bi-annual feedback meetings with WMA	2018	# of meetings held # of attendees	Meeting Records	Bi-annually	Carbon Tanzania

4.4.2 Monitoring Plan Dissemination (CM4.3)

Carbon Tanzania will share the full translated community monitoring plan with the communities through the WMA. These documents also will be made publically available on the internet for the communities, other stakeholders, and all those concerned, the WMA office will have hard copy and has internet access as well. Carbon Tanzania will also prepare a publically available annual project report that is based on the data compiled throughout the year. In addition, Carbon Tanzania will hold bi-annual meetings to share project information and data with community members. These meeting minutes are then widely available to the community with originals kept at the WMA office and copies available upon request from Carbon Tanzania.

4.5 Optional Criterion: Exceptional Community Benefits

4.5.1 Exceptional Community Criteria (GL2.1)

The project is predominantly implemented by the Authorised Association of the Makame WMA (with assistance from Carbon Tanzania and affiliates of the EENT project). The communities have ownership and management rights of the project area, which are being reinforced through the project, this is elaborated on in section 2.5. Their activities (through the implementation of the resource management plan) will generate the CCB benefits. Additionally, according to the Human Development Index[71], the project is occurring in a low human development country.

4.5.2 Short-term and Long-term Community Benefits (GL2.2)

Expected short-term and long term net positive well-being benefits for smallholders/community members are outlined in our theory of change (section 2.1.11). The theory includes the activities the project will undertake and the expected outputs, outcomes and impacts (human and natural resource related). The theory is also based on the six overall targets the project aims to achieve. Furthermore, the theory of change is closely connected to the community monitoring plan and through community monitoring the project aims to validate the assumptions of the theory of change and adjust where necessary. Expected short-term and long term net positive well-being benefits for smallholders/community members as summarised per the project theory of change chart below;

[71] *UNDP. (2016).* Human Development Report 2016: Human Development for Everyone. *Retrieved from: http://report.hdr.undp.org/*

ACTIVITIES	OUTPUTS	OUTCOMES	IMPACTS	HUMAN IMPACTS
TARGET 1				
Anti-poaching/illegal grazing	Increased law enforcement	Increased security of land	Protection and conservation of natural resources in WMA	Improved provision of ecosystem services (medicinal plants, reduced dust levels, reduced erosion, prevention of siltation of water holes and dams)
	Increased patrol hours and coverage	Decreased poaching and illegal grazing		Especially adequate pasture for livestock
Marking boundaries with signs	Community understanding of resource management plan and zone boundaries	Better pasture quality/quantity		Sustainable and conflict free pastoralism
	No deforestation in project area	Carbon stays in forest, community receives carbon revenue		Income from tourism
Conservation awareness campaign	As above	As above		Food security
Establish carbon payment scheme	Financial incentive for community to conserve the forest	No deforestation in the project area		Security and sustainability of livelihoods
		Better adherence to the resource management plan		
TARGET 2				
Develop a business plan	Provides a tourism pathway for WMA	Better managed tourism industry	Promotion of tourism in Makame WMA and natural resource conservation	Increased community resilience
	Better decision making			
Increased hunting tourism	Increase number of hunting tourists	Increased tourism revenue for WMA		Increased employment opportunities, especially favouring youth
		Creation of employment opportunities within communities		Improved provision of ecosystem services (medicinal plants, reduced dust levels, reduced erosion, prevention of siltation of water holes and dams)

		Increased protection of wildlife, less poaching		Revenue source for community development
		Increased incentive to conserve natural resources		
		Diversified income/employment sources		
TARGET 3				
Income/expenditure postings	Create transparent expenditure	Increased confidence in the WMA	Improve livelihoods of Makame WMA communities	Improved quality of life
	Increased trust & confidence in leaders	Greater respect for the resource management plan		Enhanced well-being
	Empowerment of community members over finances			Greater community cohesion
Financial accountability to community	Equitable distribution of community income	Improved service provision		Increased community resilience
		More efficiency in community development projects		Greater stability
TARGET 4				
Review resource management plan	Create more relevant resource management plan	Resource ownership	Secure land rights for WMA and natural resource conservation	Eliminate poverty through resource ownership
Stakeholder agreement on resource management plan	Maintain community resource ownership			
Authenticate resource management plan with government	Ensure stakeholder understanding of the plan			
Share new resource management plan accordingly				
TARGET 5				
Support traditional grazing zones and by-laws	Decreased unlawful grazing and land use	Better availability of graze lands throughout the whole year	Protect and maintain the culture and tradition and	Security and sustainability of livelihoods

		Improved rangeland health	natural resource conservation	Food security
		Healthy cows		Wealth
		Increased connectivity for cattle and wildlife across the landscape		Formalization of grazing rights
		Resilience and sustainability of pastoralism		
TARGET 6				
Governance training for WMA leadership	Improved capacity to manage natural resources	Better implementation of the resource management plan	Strengthen governance, improve livelihoods and natural resource conservation	More trust and confidence in leadership and the WMA structure
Governance training for village leaders & comm. members	Improved capacity to manage natural resources	Improved management of the WMA		Improved service provision
Governance training for women's leadership groups	Improved capacity to manage natural resources			Improved livelihoods
Ensure female representation in leadership	Better integration of women into decision making	Consideration of women in community decisions		Empowerment of women
		Empowerment of women		Increased gender equality

4.5.3 Community Participation Risks (GL2.3)

During sessions in August 2016 focussed on how the proposed project would affect the communities, what the communities would have to put in place to qualify for carbon payments and how project activities relate to existing land use plans and user-rights conferred to the villages through the creation of the Wildlife Management Area the communities identified 4 areas of risk involved with participation in the project;

Area	*Risk*	*Mitigation*
Grazing	*Better quality grazing could attract others to the area and lead to increased pressure*	*The resource management plan plays out the rules for incursions by non-natives into the community grazing lands*
Finance	*Increased revenue could lead to corruption and theft*	*WMA structure includes checks and financial transparency will be a linchpin of all project dealings and activities*
Culture	*Project could threaten the ancient culture of the Masai in the area due to exposure*	*The project is based on the resource management plan which was designed by the communities specifically to protect their culture and traditional natural resource uses*
Land Use	*The project could affect the way land is used in the community and restrict access*	*The project is based on the resource management plan which was designed by the communities specifically to protect traditional land uses*

4.5.4 Marginalized and/or Vulnerable Community Groups (GL2.4)

Community Group 1	*Non-cattle owning Masai (people living in poverty)*
Net positive impacts	*This group will benefit as members of the community who will gain from the development initiatives undertaken with the increased development funding available to the villages* *This group as socio-economically vulnerable often depend directly on forest products like honey and wild medicine to support them since they are without cattle, the normal currency in Masai society. Ensuring rights to the forest products and the health of the forest are a crucial benefit to these people.*
Benefit access	*Non-cattle owning Masai may leave the village areas for long periods of time so benefits conferred by village development may not reach them, however when out of the village they are spending most of the time in the forest and often living off it, therefore the forest health and access benefits will be available always.*

Negative impacts	*It is not expected that non-cattle owning Masai will see any negative impact from the project.*

4.5.5 Net Impacts on Women (GL2.5)

In addition to the positive impacts derived by the whole community through the implementation of this project, there are several benefits focused on women. These include incorporating women into positions of leadership within appointed roles in the WMA leadership, hence creating opportunities to influence decision making. Furthermore, the implementation of women's forums serves to benefit women and advance their interests in the community. These forums are provided with technical training on land policy, law and administration. The forums mobilize women and the wider community to collectively address existing threats to their lands, demand accountable governance and participatory decision making by local elected leaders, and ensure all community members' views are considered in land management decisions. Forums also address gender inequality through women's economic empowerment. Forums are given both material help and training in how to develop themselves economically.

The additional impacts of the project on women, concurrent to those affecting the entire community, are outlined in section 4.2.1. As there are no foreseen negative impacts on women associated with the project, the multitude of anticipated benefits ensure that the project will generate net positive impacts on women.

4.5.6 Benefit Sharing Mechanisms (GL2.6)

The structure of a WMA is fundamentally set up to be fully participatory on every level and allow decision-making powers to ultimately be held by the community members. It a system designed to give equal voice and concern to all members of the community through a classic representative governing structure. More on the structure of governance in the WMA which ensures it as representative and held accountable by the community can be found in the Governance section (GL2.8). Makame WMA was set up as mechanism for the five member villages to gain rights over their natural resources and subsequently fairly and equitably share benefits from them. All financial benefits conferred from the project to the communities will go directly to the WMA structure and thus we can be confident in the benefit sharing mechanism.

Per the WMA resource management plan, benefit sharing shall conform with laid down procedures from the Wildlife Division and Treasury for annual gross revenues as follows (WMA Regulation 2012):

- Capital Fund: Not less than 15% shall be capital, re-invested for WMA resource development.

- Trust Fund: Not less than 50% shall be directed to member village projects (to be split, 30% for community projects and 20% placed on fixed deposit to earn interest as a buffer for contingency, emergency, etc.).

- Operations Fund: Not less than 25% shall be used to strengthen the AA (i.e. operations, Secretariat support, MWMA meetings, training, etc.).

Carbon Tanzania has full confidence in the WMA benefit sharing structure and AA, and all benefits will be conveyed through the WMA official bank accounts they operate. WMA finances are posted and available to the community for accountability. Carbon Tanzania will also at its bi-annual meetings do a financial disclosure which will include costs and funding of the project for transparency. The WMA also employs a full time and qualified accountant to oversee financial activities. Carbon Tanzania will further monitor WMA benefit sharing through financial statements to ensure the mechanism is working and make recommendations and changes if anything is found to be inadequate

4.5.7 Benefits, Costs, and Risks Communication (GL2.7)

Following the initial training and information sessions conducted in August 2016, further training sessions have been conducted as part of an ongoing process planned to communicate benefits, costs, and risks to the communities:

1. May 2017: The draft contract documents were presented to the leadership groups of the participating villages as well as the Executive Committee of the Authorized Association. The contract contains details of how revenue is to be shared among the participating stakeholders of the project and these mediated meetings resulted in a final contract being signed on 27th May 2017.

2. November 2017: Financial revenue sharing workshops were conducted with both the Authorised Association of the Makame WMA and with leadership groups representing each of the participating villages. Sessions focused on explaining and clarifying how carbon revenues will be received, distributed and accounted for through the WMA structure.

3. The Carbon Champions, a group of 10 educated youth spent two months in 2017 attending all village meetings and doing house to house visits to spread information about the project. This included expected benefits and risks as well as the underlying mechanisms of how the project works and what is expected of the community. This was also used an opportunity for gathering questions and feedback from the community. Later some of these same community members were randomly sampled and interviewed to assess whether there was adequate understanding. The results were positive and thus the Carbon Champions program will be renewed intermittently during the duration of the project.

4. A financial guidelines document was created by Carbon Tanzania and disseminated to the communities and specifically reviewed with the WMA leadership. The Guidelines outline all the forthcoming benefits, costs and responsibilities in the financial relationship between the project developer and the WMA entity.

4.5.8 Governance and Implementation Structures (GL2.8)

The project will be governed and implemented by the Makame Wildlife Management Area administration in participation with Carbon Tanzania, that is overseeing the project design and assisting with its implementation. The governance of the WMA is distributed between the Village Council and the Authorised Association (AA), in collaboration with the District Government. It is these authorities that will enforce the WMA resource management plan which forms the foundation of this project, through which the enactment of traditional land management will create much of the CCB benefits. The responsibilities of these authorities and the regulations of the WMA can be found in the WMA Regulations 2012.

Per the WMA Regulations 2012, an AA is “a community based organisation, whose primary objective is to conserve wildlife resources for the benefit of local community members ordinarily residing in that particular area”. In Makame it is a collection of representatives elected from all the involved villages, who make the decisions for the WMA and this project, on behalf of the greater community. It is their responsibility to prepare the resource management plan. It is composed of the Board and Executive Committee, both of which are elected and are required to contain approximately 30% women. These are supported by the Village Game Scouts, a Revenue Committee and a Security Committee, as well as additional representatives from each member village, to complete the AA. The AA works in conjunction with the Village Councillors, who are elected within each village. The Village Game Scouts are appointed to protect the natural resources within the WMA and help to enforce the resource management plan. They work closely with the Officer for Community and Patrolling. Within the villages there are also Women’s Forums. These contain 24 members each, elected from each of the sub-villages, that receive trainings regarding rights and leadership from UCRT, including on how to themselves rise to positions of leadership and how to demand and support better governance from existing leadership. Village governance is composed of the elected Chairman, the Village Executive Officer, Village Secretary and the Village Council; who undertake the requests of the entire Village Assembly (everyone above 18 years).

The District Government is responsible to support the WMA by establishing a District Natural Resources Advisory Body, who’s duties are detailed in section 2.1.7 of this document. This Body shall comprise the following members:

- District Commissioner
- District Executive Director
- District Legal Officer
- District Land Officer
- District Forestry Officer
- District Bee-Keeping Officer
- District Community Development Officer
- Three representatives of the AA

In addition, project governance and implementation is supported by UCRT and Carbon Tanzania. This support is aimed at improving governance structures within the WMA enabled through capacity building and training provision. Training topics include good governance, book-keeping, financial management, conflict resolution, and current government laws and policies. These organisations have experience working with a collection of specialised organisations, predominantly local NGOs, involved in the greater Endangered Ecosystems of Northern Tanzania project.

It is inherent in the functioning of a WMA that smallholders and community members are involved in decision making processes through their elected representatives. The concept of democracy is well understood throughout Tanzania and carefully applied in the implementation of this project by the project developers, Carbon Tanzania and UCRT.

4.5.9 Smallholders/Community Members Capacity Development (GL2.9)

Community member capacity development has already been undertaken in the project. The AA and the village leadership groups led the development of the Conservation Action Plan, conducted in August 2016[72]. The village leadership groups have been involved in learning sessions with the project developer as well as with development partners in the landscape (The Nature Conservancy, Ujumaa Community Resource Team). Educational sessions in Maa and Kiswahili have been conducted by a skilled educator to explain all aspects of REDD developments to leaders, administrators and youth in the participating villages. Village Game Scouts have been trained in basic patrol protocols and monitoring for the project activities and have participated in the Carbon Baseline activity. The Carbon Champions program has created 10 well informed and educated youth who have been provided employment opportunities to spread information and understanding of the project at all levels into the farthest reaches of the community. A financial training session has improved the capacity of the leadership to interact with the developer (and other future private interests) on financial matters and produced a financial guidelines document. Throughout the project's lifespan one of Carbon Tanzania's focuses with our partners will be developing and increasing the capacity of the community and of the WMA as an entity.

[72] Ibid

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (B1.1)

The northern Tanzania rangelands cover the heart of northern Tanzania's Great Rift Valley. Covering an area of about 35,000,000 hectares, from Lake Natron in the north, south along the rift through Manyara and Tarangire National Parks to Makame WMA. Ecologically, these rangelands have been defined based on the seasonal movement of large mammal populations across wet and dry season ranges (see map 5.1.1a).

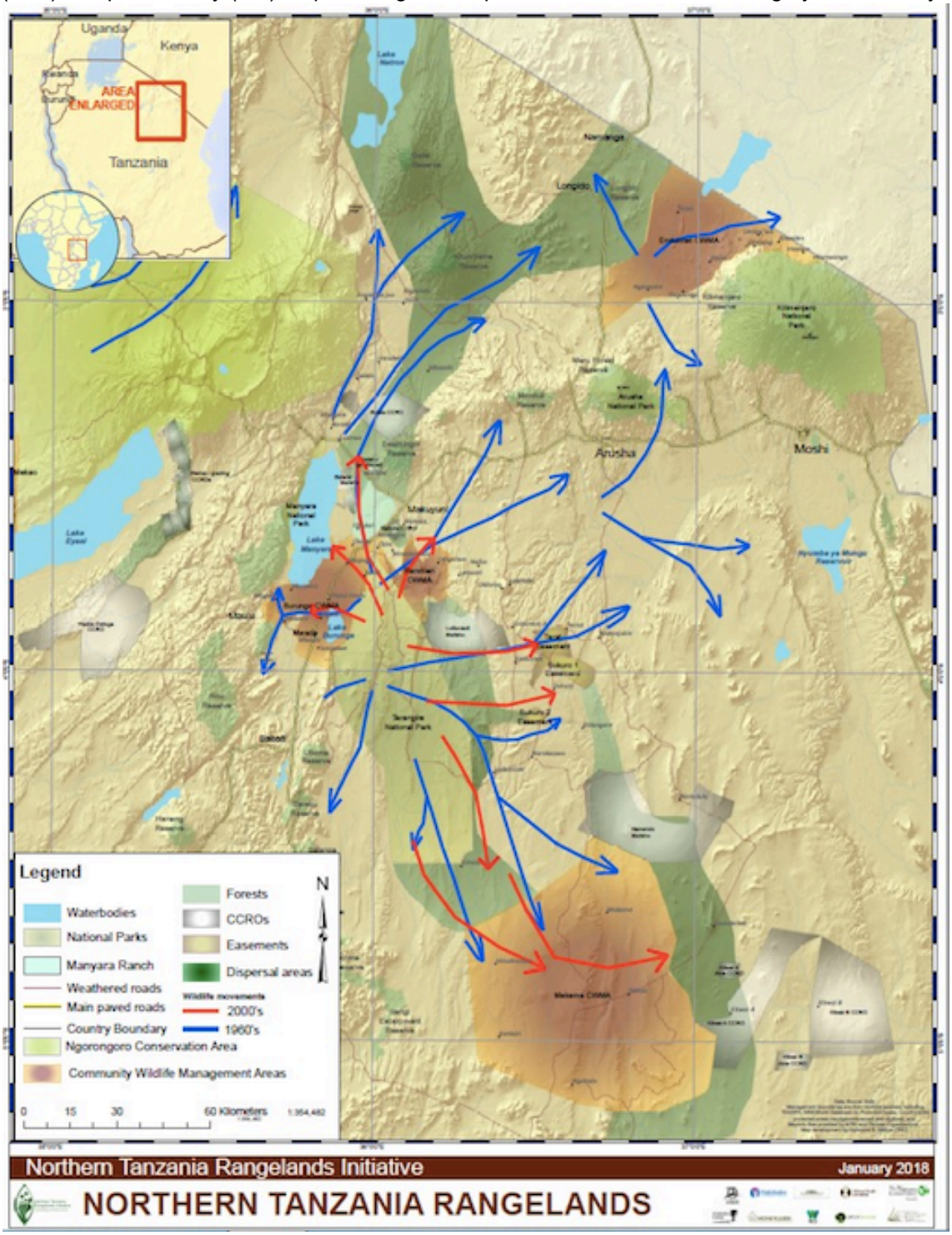
The Tarangire and Manyara National Parks are part of a single ecosystem which contains the second-largest population of migratory wild ungulates in East Africa (after the Serengeti-Mara ecosystem), as well as the largest population of elephants in northern Tanzania. Makame WMA represents the southern limit of this vast ecosystem and covering 364,322 hectares (900,259 Acre), is also the largest community protected area in Tanzania, the WMA is dominated by Acacia-Commiphora woodland and thickets with open grasslands in the seasonally flooded lower lying areas. The landscape is interspersed with rocky hills and seasonal swamps creating diverse habitats that support both migratory and resident mammal and bird populations. Of these, 7 species of bird and 9 species of mammal are listed by IUCN as threatened (see table 5.5.1a/b)[73].

Lake Manyara and Tarangire National Parks protect the core refuge for large mammals during the dry season (July – November), however once the rains begin in November, many of the large mammals disperse, migrating out of the national parks where they are protected, into a variety of areas where they have either no formal protection or into areas like Makame WMA where the communities have the rights to manage[74] and protect the wildlife and its habitats. The Tarangire-Manyara ecosystem has a rich diversity of wildlife, with over 500 species of birds and over 100 species of mammals, thus Makame, which forms a large part of that ecosystem represents a critical habitat for both charismatic megafauna and endemic species of birds.

[73] International Union for the Conservation of Nature: https://www.iucn.org/resources/conservation-tools/iucn-red-list-threatened-species

[74] In this context the communities have the rights to manage the wildlife, meaning protect and earn revenue from wildlife tourism, both photographic and hunting.

Map 5.1.1.a. The Tarangire – Manyara Ecosystem stretches along the great rift valley from the Tanzania-Kenya border in the north, south along the rift valley to Makame WMA. Makame WMA, the largest protected area in the ecosystem, protects key migration routes. This map shows megafauna migration routes in 1960s (blue) and present day (red) emphasising how important Makame is to the integrity of the ecosystem.



Large mammals within Makame WMA

Situated 15 kilometres south east of Tarangire National Park, Makame WMA is an important corridor and dispersal area for large ungulates and is a key conservation area for resident and migratory populations of African Elephant (*Loxodonta Africana*) and Cape Buffalo (*Syncerus cafer*)[75]. Aerial counts (Systematic Reconnaissance Flight - SRF)[76] conducted in 2016 by the Tanzania Wildlife Research Institute (TAWIRI) as part of the USAID funded EENT project[77] have enabled us gain an understanding of mammals across the greater Tarangire-Manyara Ecosystem[78]. The objective of the SRF survey was to establish the population status and geographical distribution of large mammals within the ecosystem. This data was then used to compare 19 previous SRF and total counts that have been conducted within the ecosystem between 1990 and 2016. Based on the 2016 SRF a total of 28 species of mammal were recorded across the ecosystem, of which 17 species of mammal were within Makame WMA.

When we consider long term trends, ***there has been a steady decline in wildlife across the Tarangire ecosystem over the past 25 years (1987-2011); this equates to a 35% decline (based on buffalo and elephant population data between 1987 and 2011)*** [79]. However, not all species have shown the same declines. Highly mobile species such as wildebeest and oryx have seen higher declines over the 1987-2011 period due to these species dispersing into areas where they are susceptible to poaching. Elephants in particular have seen higher declines with the current population around 4,200 individuals, during the latest 2016 Survey Reconnaissance Flight (SRF), elephant carcasses were also counted to allow for an estimate of mortality, given the 2014 total count figure against carcasses counted the mortality rate is close to 9% which is noted as a cause for concern.

The 2016 SRF count does indicate that when compared to recent counts, seven species of mammal are stable across the ecosystem: wildebeest, zebra, impala, kongoni and Grant's gazelle. The 2016 count also indicates that several species showed an increasing population trend: giraffe and Thompson's gazelle, Bohor reedbuck, warthog and kudu (differentiating greater and lesser kudu from a plane is quite challenging).

Table 5.5.1.a. Threatened mammal species recorded within Makame WMA

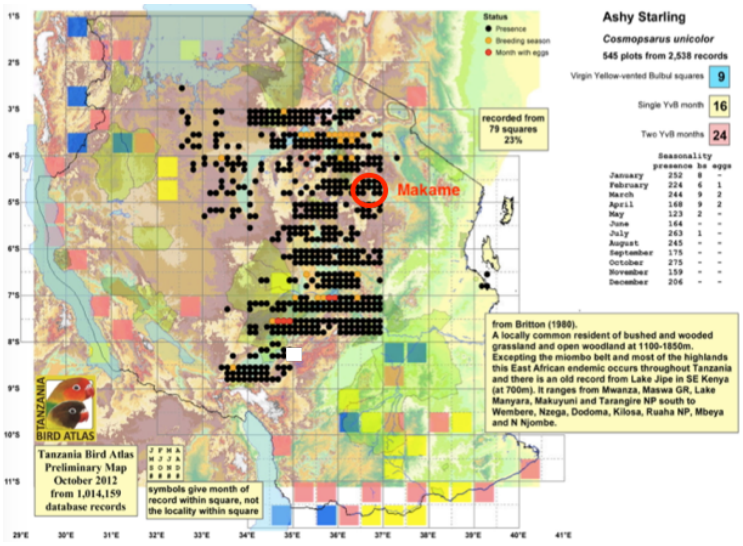
Genus	Species	English name	Red list status (IUCN)	Population trend (IUCN)
Acinonyx	*jubatus*	Cheetah	VU	decreasing
Giraffa	*camelopardalis*	Giraffe	VU	decreasing
Loxodonta	*africana*	African Elephant	VU	increasing
Lycaon	*pictus*	African Wild Dog	EN	decreasing
Oryx	*beisa*	Beisa Oryx	VU	decreasing
Panthera	*leo*	African Lion	VU	decreasing
Panthera	*pardus*	Leopard	VU	decreasing
Smutsia	*temminckii*	Temminck's Ground Pangolin	VU	decreasing

[75] Foley (2015), Wildlife Trends and Status of Migratory Corridors in the Tarangire Ecosystem
[76] SRF follows Norton-Griffiths (1978), as a sample method SRF involves flying transects where the average density of each species is multiplied by the total area to produce a estimate for the total area.
[77] USAID fund the Endangered Ecosystem Northern Tanzania project which incorporates a number of partner organizations, the biodiversity assessments conducted are part of the same funding source as the development of this REDD project.
[78] Tanzania Wildlife Research Institute, 2016 aerial census in the Taranagire-Manyara ecosystem, 2016. TAWIRI Survey Report.
[79] ibid

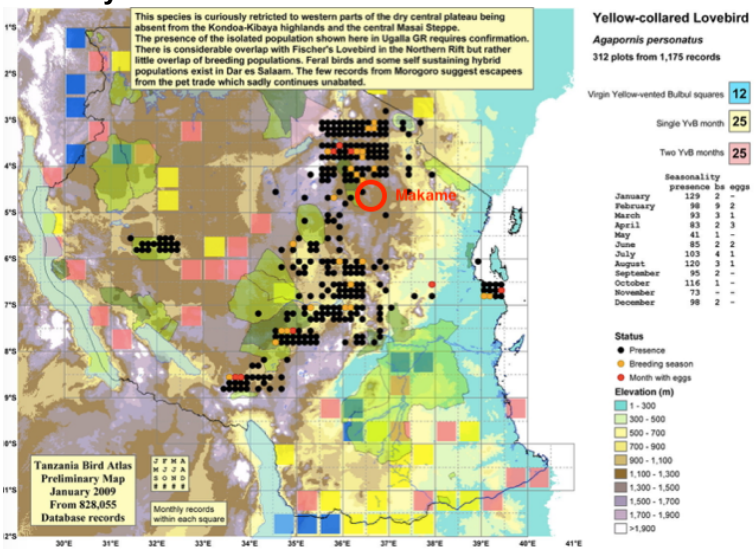
Birds within Makame WMA

Until recently virtually nothing was known about the avifauna of this vast area, but work by the Tanzania Bird Atlas[80] over the last 15 years has enabled us to develop a species list of Makame WMA and the surrounding area. Makame WMA falls within 5 quarter degree bird atlas squares and a total species list of 500 species of birds of which two are endemic to Tanzania, Ashy Starling and Yellow-collared Lovebird (see Maps 5.5.1.b/c) and 6 are listed by IUCN as threatened species. The project area is situated in the northern of these quarter degree squares (Square number 3604D, see annex for full species list).

Map 5.5.1.b. Ashy Starling, Tanzanian endemic restricted to the dry central plateau of Tanzania and common within Makame WMA.



Map 5.5.1.c. Yellow-collared Lovebird. This enigmatic species is endemic to Tanzania, east of the rift valley.



[80] www.tanzaniabirdatlas.net

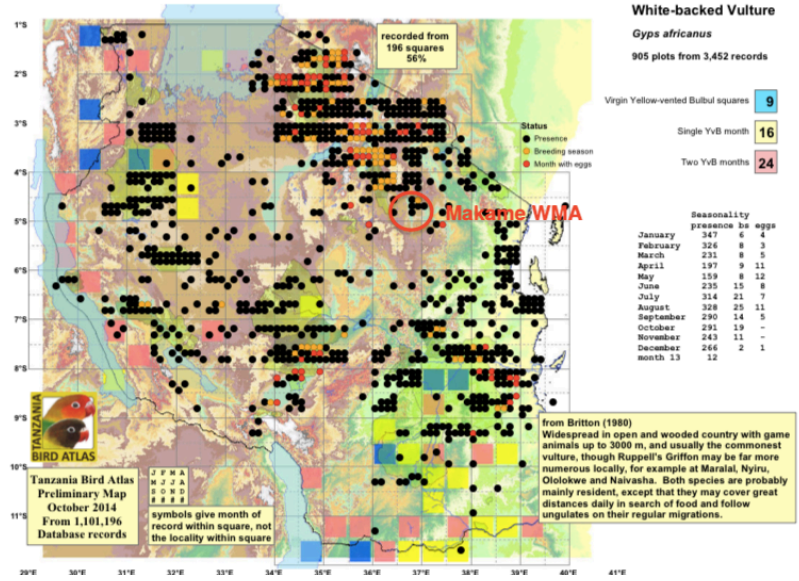
Makame WMA represents the southern-most limit for several species restricted to the Somali-Masai biome such as Vulturine Guineafowl, Hunter's Sunbird and Pringles Puffback. Makame WMA is thought to be an important area for Palearctic migrants wintering in east Africa[81] and its ephemeral wetlands are important breeding areas for many species of waterfowl that migrate into the area during the onset of the rains in December-January.

Table 5.1.2. Six threatened bird species and two endemics recorded within Makame WMA

Genus	Species	Common names (Eng)	Red List status (IUCN	Population trend (IUCN)
Bucorvus	*leadbeateri*	*Southern Ground-hornbill*	*VU*	*decreasing*
Gyps	*africanus*	White-backed Vulture	CR	decreasing
Gyps	*rueppelli*	Rüppell's Vulture	CR	decreasing
Trigonoceps	occipitalis	White-headed Vulture	CR	decreasing
Polemaetus	*bellicosus*	Martial Eagle	VU	decreasing
Sagittarius	*serpentarius*	Secretarybird	VU	decreasing
Lamprotornis	*unicolor*	Ashy Starling	LC	Stable
Agapornis	*personatus*	Yellow-collered Lovebird	LC	Stable

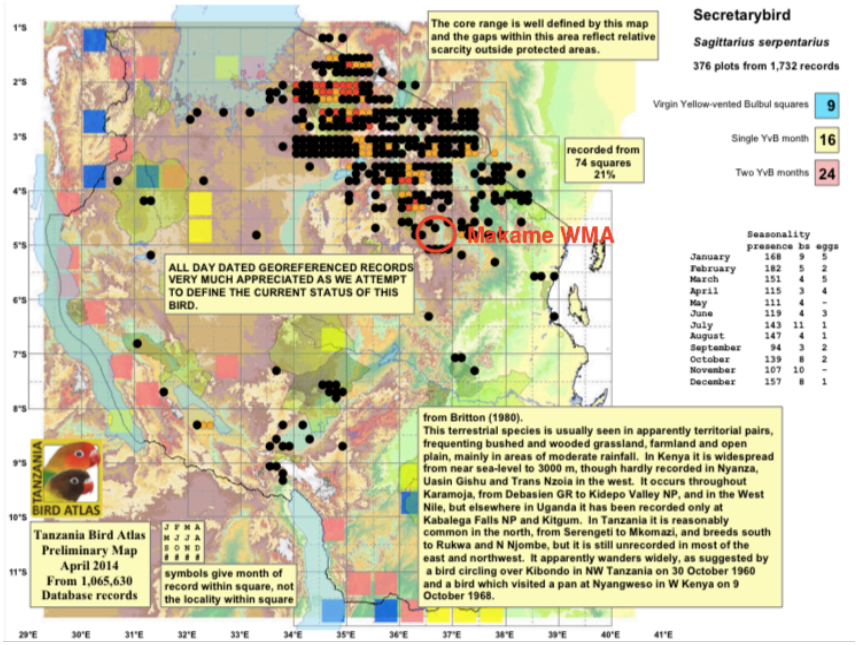
The Makame landscape is also critical for wide-ranging threatened species such as White-backed and White-headed Vultures (see map 5.5.1.d/e), these species are now critical and declines can be related to habitat fragmentation and loss of large herbivore-predator interactions that provide the carrion for these species.

Map 5.5.1d. White-backed Vulture distribution in Tanzania.



[81] Baker N.E. and Baker E.M. (2002) Important Bird Areas in Tanzania: A first Inventory. Wildlife Conservation Society of Tanzania. Dar-es-Salaam, Tanzania.

Map 5.5.1.e. White-headed Vulture distribution in Tanzania



5.1.2 High Conservation Values (B1.2)

Table 5.1.2. Shows the HCV species recorded within the project area, their red list status and population trend[82]. Note that the vulture species are wide ranging although dependent on large herbivores and predator-prey interactions for carrion.

High Conservation Value (HCV			Specific HCV		
Genus	**species**	**Common names (Eng)**	**Red List status**	**Population trend**	**Focal area**
Bucorvus	*leadbeateri*	*Southern Ground-hornbill*	*VU*	*decreasing*	Throughout the WMA
Gyps	*africanus*	White-backed Vulture	CR	decreasing	Resident within the WMA and project area
Gyps	*rueppelli*	Rüppell's Vulture	CR	decreasing	Non-Resident within the WMA and project area
Trigonoceps	occipitalis	White-headed Vulture	CR	decreasing	Resident within the WMA and project area
Polemaetus	*bellicosus*	Martial Eagle	VU	decreasing	Resident within the WMA and project area
Sagittarius	*serpentarius*	Secretarybird	VU	decreasing	Resident within the WMA and project area
Lamprotornis	*unicolor*	Ashy Starling	LC	Stable	Tanzanian Endemic Resident within the WMA and project area
Agapornis	*personatus*	Yellow-collared Lovebird	LC	Stable	Tanzanian Endemic Resident within the WMA and project area
Acinonyx	*jubatus*	Cheetah	VU	decreasing	Movement into the WMA and project area

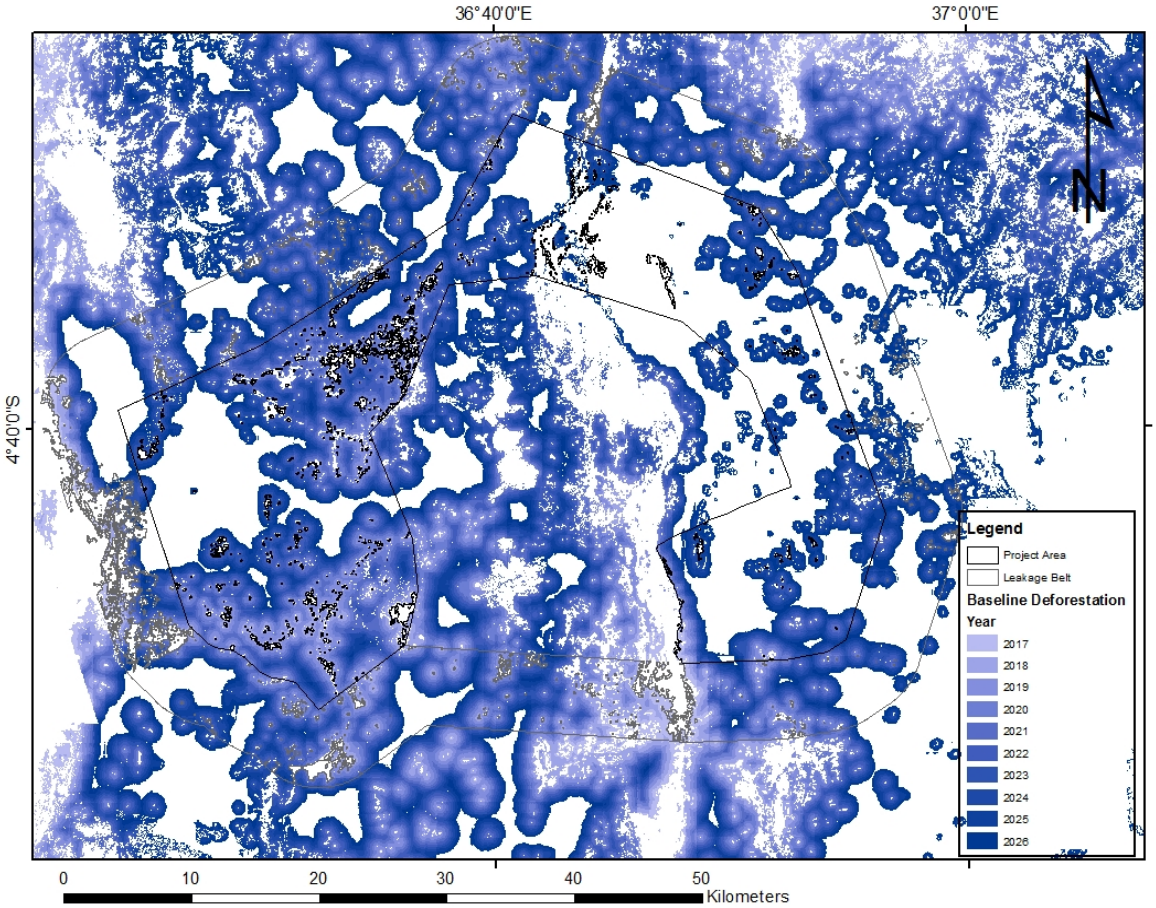
[82] Species lists from Tanzania Bird Atlas www.tanzaniabirdatlas.org IUCN red list data from International Union for the Conservation of Nature: https://www.iucn.org/resources/conservation-tools/iucn-red-list-threatened-species

Giraffa	*camelopardalis*	Giraffe	VU	Globally populations are decreasing however are considered stable within the Makame WMA area	Resident within the WMA and project area. Possibly migratory populations.
Loxodonta	*africana*	African Elephant	VU	Globally populations have declined with Tanzania suffering one of the greatest declines of 60% from 2010-2015 (great Elephant census).	Resident within the WMA and project are with migratory populations from Tarangire during the wet season
Lycaon	*pictus*	African Wild Dog	EN	decreasing	Resident within the WMA and project area
Oryx	*beisa*	Beisa Oryx	VU	decreasing	Resident within the WMA and project area
Panthera	*leo*	African Lion	VU	decreasing	Resident within the WMA and project area
Panthera	*pardus*	Leopard	VU	decreasing	Resident within the WMA and project area
Smutsia	*temminckii*	Temminck's Ground Pangolin	VU	decreasing	Resident within the WMA and project area

5.1.3 Without-project Scenario: Biodiversity (B1.3)

The conditions existing prior to project initiation are described in section 2.1.5, and expected to continue in the baseline scenario as described in section 3.1.4. Without effective implementation of the WMA RMP and component anti-poaching and habitat protection activities, abundance and diversity of game species and woodland and scrub matrix-dependent species in the project area is expected to decrease.

Map 5.1.3. Predicted conversion of natural habitat to shifting cultivation in the absence of the project.



Many areas in Africa, such as the Tarangire–Manyara Ecosystem in northern Tanzania, form a patchwork of protected and unprotected areas and experience substantial human population growth[83]. In the Tarangire – Manyara Ecosystem, pastoral Maasai areas such as areas around Makame WMA are gradually shifting away from exclusive pastoralism towards both subsistence and commercial agriculture and illegal hunting is rampant, particularly outside fully protected areas.[84] This development may directly and indirectly reduce

[83] Msoffe, F.U., Said, M.Y., Ogutu, J.O., Kifugo, S.C., de Leeuw, J., van Gardingen, P. & Reid, R.S. (2011) Spatial correlates of land-use changes in the Maasai-Steppe of Tanzania: implications for conservation and environmental planning. *Int. J. Biodivers. Conserv.* 3, 280–290.
[84] Kiffner et al. (2014) From savannah to farmland: effects of land-use on mammal communities in the Tarangire-Manyara ecosystem, Tanzania. African Journal of Ecology. Vol 53, issue 2.

wildlife species richness[85] whilst reduced species richness often leads to a loss of functional species groups which in turn can be lead to trophic cascades and may affect ecosystem services.[86] Beyond such ecological consequences, a loss of species richness may directly compromise tourism, an important source for Makame WMA as well other areas within the Tarangire-Manyara ecosystem.[87]

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (B2.1)

Table 5.2.1. Anticipated changes in biodiversity resulting from project activities under the with-project scenario in the project zone and over the project lifetime.

	Species information
Biodiversity element	**Giraffe**
Estimated change	Population increases
Justification for change	This species is now considered vulnerable due to population declines throughout its African range. Habitat protection, prevention of meat poaching within Makame WMA and as part of the Tarangire-Manyara ecosystem will protect its range.
Biodiversity element	**African Elephant**
Estimated change	Population remains stable or increases
Justification for change	This species is now considered vulnerable due to population declines throughout its African range. Habitat protection, prevention of ivory poaching within Makame WMA and as part of the Tarangire-Manyara ecosystem will protect its range.
Biodiversity element	**African Wild Dog**
Estimated change	Population remains stable or increases
Justification for change	This species is now considered endangered due to rapid population declines throughout its African range. Habitat protection, protection of food source, prevention of destruction of dens with young (where it is most susceptible) within Makame WMA. This wide-ranging species is moving throughout the Tarangire-Manyara ecosystem.
Biodiversity element	**Beisa Oryx**
Estimated change	Population remains stable or increases

[85] Ogutu, J.O., Bhola, N. & Reid, R. (2005) The effect of pastoralism and protection on the density and distribution of carnivores and their prey in the Mara ecosystem of Kenya. *J. Zool.* **265**, 281–293.
[86] Flynn, D.F.B., Gogol-Prokurat, M., Nogeire, T., Molinari, N., Richers, B., Lin, B.B., Simpson, N., Mayfield, M.M. & Declerck, F. (2009) Loss of functional diversity under land-use intensification across multiple taxa. *Ecol. Lett.* 12, 22–33.
[87] Nelson, F., Nshala, R. & Rodgers, W.A. (2010) The evolution and reform of Tanzanian wildlife management. *Conserv. Soc.*5, 232–261.

Justification for change	This species is now considered vulnerable due to rapid population declines throughout its African range. Habitat protection, prevention of poaching within Makame WMA. This wide-ranging species is moving throughout the Tarangire-Manyara ecosystem however Makame has resident populations.
Biodiversity element	**African Lion**
Estimated change	Stable population
Justification for change	This species is now considered vulnerable due to rapid population declines throughout its African range. Habitat protection, protection of food source, prevention of poaching and retaliatory killing within Makame WMA. This species is and moving throughout the Tarangire-Manyara ecosystem although resident populations occur.
Biodiversity element	**African Leopard**
Estimated change	Stable population
Justification for change	This species is now considered vulnerable due to population declines throughout its African range. Habitat protection, protection of food source and prevention of poaching within Makame WMA. This species is resident within the WMA.

5.2.2 Mitigation Measures (B2.3)

The main threats to megafauna in this landscape stem from habitat fragmentation and loss of landscape connectivity, addressing these forms the fundamental design of this project. By successfully implementing the resource management plan, Makame WMA will enhance habitat for resident and migratory megafauna. The design of this project and the wildlife laws of Tanzania enable the Authorised Association of Makame WMA to take the necessary actions, where needed, to maintain the protection of biodiversity within the project area. The WMA, its development and implementation under the wildlife act and land act of Tanzania ensure it is a community owned and participatory process that includes all community stakeholders ensuring representative decision making. The governance, management and implementation of the WMA is supported by Carbon Tanzania, District Government and other stakeholders as described in the contract between Carbon Tanzania and Makame WMA. Based on project design, implementation and structure of the WMA, the precautionary principle in environmental science[88] follows: to take preventive action in the face of uncertainty; shifting the burden of proof to the proponents of an activity; exploring a wide range of alternatives to possibly harmful actions; and increasing public participation in decision making.

5.2.3 Net Positive Biodiversity Impacts (B2.2, GL1.4)

The conditions existing prior to project initiation include those describe in section 2.1.5. Further these conditions are the same as the baseline scenario as described in section 3.1.4. This project has been designed to implement the Makame WMA Resource Management Plan (RMP) which focuses on the protection and conservation of natural resources. The species outlined in section 5.2.1 all require large tracts of intact habitat, both resident and migratory populations exist in the project area and in adjacent habitats. In the case of resident predators such as Leopard, Cheetah and Lion, the presence of prey species

[88] D Kriebel, J Tickner, P Epstein, J Lemons, R Levins, E L Loechler, M Quinn, R Rudel, T Schettler, M Stoto Precautionary Principal in Environmental Science. Environ Health Perspect. 2001 Sep; 109(9): 871–876.

in sufficient densities is essential for breeding success. Wild Dog populations are almost certainly ranging between Makame WMA and Tarangire National Park, along with megafauna such as elephant, oryx and giraffe, landscape connectivity is therefore critical for these herbivores.

5.2.4 High Conservation Values Protected (B2.4)

This project will monitor 6 species of mammal. The different monitoring techniques enable this project to collect both qualitative and quantitative data (see section 5.4).

Table 5.2.5. List of species monitored by this project.

High Conservation Value (HCV			Specific HCV		
Genus	**species**	**Common names (Eng)**	**Red List status**	**Population trend**	**Focal area**
Giraffa	*camelopardalis*	Giraffe	VU	Globally populations are decreasing however are considered stable within the Makame WMA area	Resident within the WMA and project area. Possibly migratory populations.
Loxodonta	*africana*	African Elephant	VU	Globally populations have declined with Tanzania suffering one of the greatest declines of 60% from 2010-2015 (great Elephant census).	Resident within the WMA and project are with migratory populations from Tarangire during the wet season
Lycaon	*pictus*	African Wild Dog	EN	decreasing	Resident within the WMA and project area
Oryx	*beisa*	Beisa Oryx	VU	decreasing	Resident within the WMA and project area
Panthera	*leo*	African Lion	VU	decreasing	Resident within the WMA and project area
Panthera	*pardus*	Leopard	VU	decreasing	Resident within the WMA and project area

5.2.5 Invasive Species (B2.5)

No Invasive species currently present a threat in this landscape.

5.2.6 Impacts of Non-native Species (B2.6)

This project is based on the WMA resource plan and will not use any non-native species

5.2.7 GMO Exclusion (B2.7)

No genetically modified organisms currently occur or are planned to occur within the project area. GMO are currently illegal in Tanzania for non-academic uses.

5.2.8 Inputs Justification (B2.8)

No agricultural inputs are currently used.

5.2.9 Waste Products (B2.9)

No waste products will be generated by this project.

5.3 Offsite Biodiversity Impacts

5.3.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Measures (B3.2)

No known negative offsite biodiversity impacts.

5.3.2 Net Offsite Biodiversity Benefits (B3.3)

This project provides considerable offsite biodiversity benefits as the project area in Makame WMA represents the southern limit of the Tarangire-Manyara ecosystem (see map section 5.1.1.), an area of 35,000,000 Ha supporting the second largest mammal concentration within Tanzania. The ecosystem contains two national parks, Manyara and Tarangire that protect the core refuge for large mammals during the dry season (July – November). Once the rains begin in December, many of the large mammals disperse, migrating out of the national parks where they are protected, into a variety of areas where they have either no formal protection or into areas like Makame WMA where the communities have the rights to protect the wildlife. The Tarangire-Manyara ecosystem has a rich diversity of wildlife, with over 500 species of birds and over 100 species of mammals and thus Makame, which forms a large part of that represents a critical habitat for enigmatic megafauna and endemics species of birds.

5.4 Biodiversity Impact Monitoring

5.4.1 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

Carbon Tanzania has designed this BMP to adhere to the requirements of the CCBA to monitor the biodiversity impacts of the Makame Savannah REDD project. Net impacts resulting from project conservation activities are assessed as the difference, with respect to defined biodiversity indicators, between the without-project baseline scenario and direct monitored project outcomes. The baseline scenario involves ongoing deforestation, resulting in complete removal of native forest cover in the project area. The baseline scenario, and its justification, is detailed in the VCS Project document (Section 3 PD). With loss of native forest cover, habitat fragmentation and loss of ecosystem connectivity, the baseline scenario, in terms of biodiversity, involves declining mammal populations and decline of rare and threatened species and biotic communities.

In defining baseline biodiversity indicator values, CT has used the literature, previous survey reports (both aerial and ground-based surveys) for Makame WMA and surrounding Tarangire-Manyara Ecosystem. These previous data do not account for many of the smaller species of mammal and carnivores, so a camera trapping exercise will be conducted in 2017 to establish a detailed species list and species abundance within the project area. The BMP identifies biodiversity (including trigger species relevant to demonstration of exceptional biodiversity benefits) and High Conservation Value (HCV) indicator variables to be monitored; areas monitored; method of sampling; and the frequency of monitoring and reporting.

Table 5.4.1. Biodiversity monitoring framework

Objective	Activity	Anticipated impact	Indicator	Area monitored	Sampling method	Frequency of monitoring	Responsible to monitor
Protection of Acacia-commiphora woodland	Implement ation of the Makame RMP	Maintenance of ecosystem diversity, habitat connectivity	Reduction of deforestation within the project area, see Section 3. Table 3.39 (Net Emission Reductions)	Carbon project area, 104,065 ha	Assessment of forest cover change via time series of classified satellite imagery	2005, 2010, 2015 Subsequently every five years or less	Carbon Tanzania
Annual monitoring of mammal populations in project area	Ground count surveys	Index of abundance for all mammal species	Species presence and absence	S14: 33.3KM S15: 24.2km S17:8.1km S18:24.2km Total 91.7km	Ground count survey methodology	Annual count first count wet season 2016 and repeated 2017-2046	Carbon Tanzania
Monitoring of total mammal species in project area	Camera trapping	Presence and relative abundance of mammal species	Relative abundance index (RAI) of indicator species	Selected site within project area	Camera trap survey	September - December 2017	Wildlife Conservation Society
Monitoring of total mammal species in project area	Wet season occupancy survey	Presence and occupancy of HCV mammal species	Dung for Elephant and spoor for large carnivores and sightings for all mammal species	S14: 33.3KM S18:24.2km Total 57.5km	Occupancy modelling	April 2019 - 2046	Carbon Tanzania & School for field studies – centre for wildlife management studies.[89]

Ground survey methodology

The survey team will consist of three people: a driver, a left seat observer and a rear seat observer. The driver will monitor all wildlife sightings on the road, while the observers recorded animals on their respective side of the vehicle. The vehicle drives the prearranged transect (S14, 17, 18 and 14) at 20km/h. Whenever an animal is seen, information is recorded on the location (Global Positioning System [GPS] point), the species, and number of individuals. Animals over 50 meters apart are considered to be a different group. Every 2km habitat was noted based on one of 5 categories; Grassland, open bushland, thick bushland, open woodland, thick woodland.

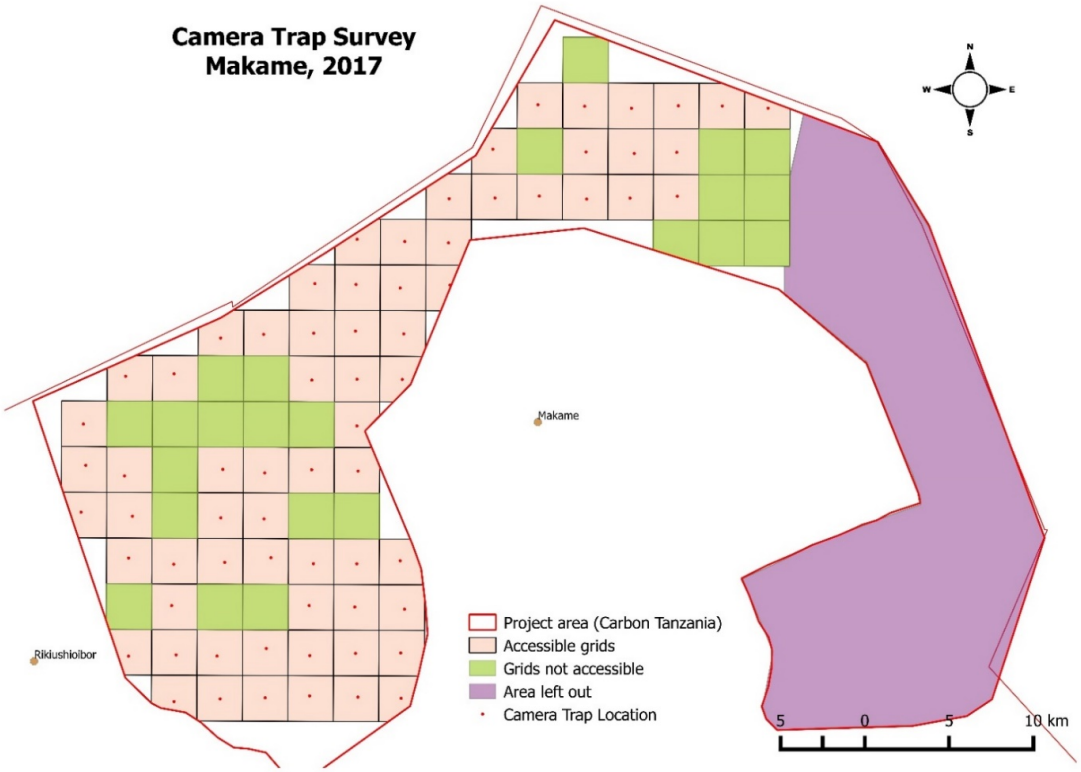
The track log for each transect will be recorded by GPS and downloaded at the end of the survey. Transects will be started at approximately 7:00 am until around mid-day, and then again from 3:00 pm to dusk. This will be done to avoid the hottest hours of the day, when wildlife activity is at its lowest. All mammals will be recorded.

Camera trapping

Camera trap analysis will be completed within the first five years of the project. Very little is known about the wildlife in Makame, especially small mammals and nocturnal animals. Wildlife Conservation Society (WCS) in partnership with CT plan to conduct a camera trap survey of the WMA in the dry season (September-December 2017). A total of 49 cameras will be set up and removed after a period of six weeks, after which a further 20 will be set up in different locations and removed at the end of December 2017. This will amount to a total of 69 camera traps covering an area of around 650km^2 aimed at understanding species richness and habitat selection within the project area. For a thorough and complete analysis a minimum of 60 sites will be needed. Camera traps will be set up in the middle or close to the middle of each grid.

[89] fieldstudies.org

Planned camera trap survey design for September – December 2017



Occupancy modelling

Occupancy modelling

To monitor the impact of this REDD project on biodiversity, we will focus on assessing the presence and occupancy of the 6 target mammal species inside and outside the project area. Because accessibility of the project area in Makame WMA is very limited due to impenetrable vegetation cover in many parts of the project area (particularly during the wet season when many wildlife species move from adjacent Tarangire National Park to Makame WMA), we will conduct road transects and analyze the data within an occupancy modelling framework[90]. Transects will follow roads that are accessible all year, are 1 km in length and separated by a 150m stretch to ensure independence of sampling units (see map below). We aim at visiting each transects on four separate occasions within one week to ensure closure assumptions; for species with high detection probability, a minimum of three repeat surveys are recommended [1]. For each species, we will create detection histories which indicate presence/absence of target species in each transect and sampling occasion. Using these detection histories, we will estimate species-specific detection probabilities. To account for the non-random sampling approach (roads are unlikely to cross the study area in a random manner) we will assess environmental variables at each transect using field observations and GIS information (e.g. inside/outside project area, main habitat type, presence of livestock, etc.). When modelling occupancy for each species, we will explicitly test the influence of these variables and thus account for

Mackenzie DI, Royle JA. Designing occupancy studies: General advice and allocating survey effort. J Appl Ecol. 2005;42(6):1105–14.

MacKenzie DI, Nichols JD, Royle JA, Pollock KH, Bailey LL, Hines JE. Occupancy estimation and modelling - Inferring patterns and dynamics of species occurence. Burlington: Academic Press; 2006. 324 p.

potential bias associated with the non-random distribution of transects. Hence, our monitoring accounts for (1) imperfect detection of species and (2) explicitly addresses and quantifies issues related to non-random sampling. As target species we will focus on species (groups) that are of major ecological and conservation concern:

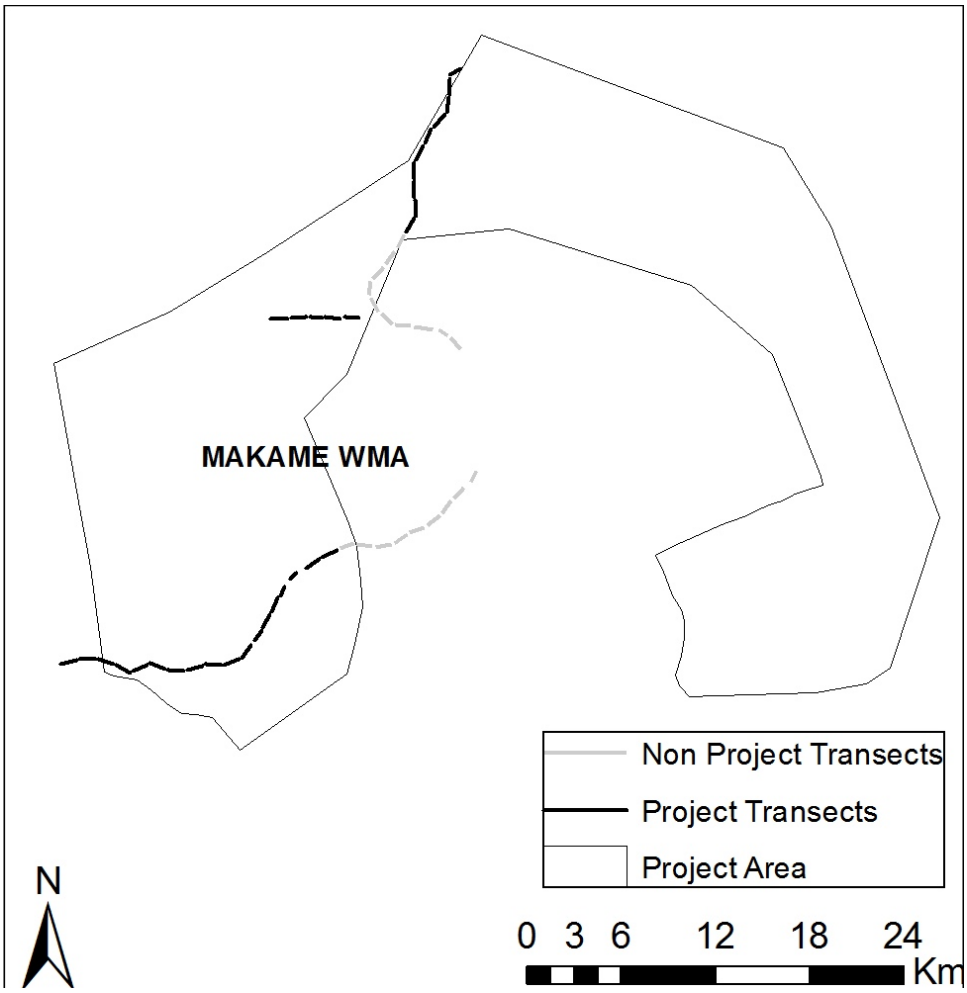
1. Elephants *Loxodonta africana*; since elephants are rather skittish in the study area and dense vegetation limits observer visibility, elephant presence will be assessed based on dung piles and spoor.

2. Large herbivores e.g. giraffe *Giraffa camelopardalis*; many herbivore species can be sufficiently observed while driving along the transect however spoor will also be used.

3. Large carnivores, e.g. African lion *Panthera leo*, Leopard *Panthera pardus*, African wild dog *Lycaon pictus*; presence of these species will be assessed by detecting their tracks. This will be achieved by employing a Hadza tracker who will be sitting in a seat on the bull bar of the vehicle.

If repeated annually in the same way, temporal trends of species-specific occupancy estimates can be reliably assessed.

Map of occupancy modelling transects both inside and outside the project area.



5.4.2 Biodiversity Monitoring Plan Dissemination (B4.3)

The biodiversity monitoring plan (BMP) has been summarised, translated and disseminated to the WMA, the same is the case for any results of monitoring undertaken in accordance with the monitoring plan. Data from biodiversity monitoring is also sent to the relevant databases for birds and mammals in the country.

5.5 Optional Criterion: Exceptional Biodiversity Benefits

This project provides exceptional biodiversity benefits as the project area in Makame WMA represents the southern limit of the Tarangire-Manyara ecosystem (see map section 5.1.1.), an area of 35,000,000 Ha supporting the second largest mammal concentration within Tanzania. The ecosystem contains two national parks, Manyara and Tarangire that protect the core refuge for large mammals during the dry season (July – November). Once the rains begin in December, many of the large mammals disperse, migrating out of the national parks where they are protected, into a variety of areas where they have either no formal protection or into areas like Makame WMA where the communities have the rights to protect the wildlife. This project will monitor 6 species of threatened bird species, 2 species of endemic bird and 8 species of threatened mammal, including charismatic landscape megafauna (see section 5.4).

5.5.1 High Biodiversity Conservation Priority Status (GL3.1)

Table 5.5.1. Species occurring within the project area and data source for the records

High Conservation Value (HCV			
Common names (Eng)	**Red List status (IUCN)**	**Global population trend (IUCN)**	**Data source**
Giraffe	VU	Globally populations are decreasing however are considered stable within the Makame WMA area	Resident within the WMA and project area. Observations, Ground counts and camera traps.
African Elephant	VU	Globally populations have declined with Tanzania suffering one of the greatest declines of 60% from 2010-2015 (great Elephant census).	Resident within the WMA and project area with migratory populations from Tarangire during the wet season. Observations and camera traps
African Wild Dog	EN	decreasing	Resident within the WMA and project area. Observations and camera traps
Beisa Oryx	VU	decreasing	Resident within the WMA and project area

			Observations and camera traps
African Lion	VU	decreasing	Resident within the WMA and project area Observations and camera traps
Leopard	VU	decreasing	Resident within the WMA and project area Observations and camera traps

5.5.2 Trigger Species Population Trends (GL3.2, GL3.3)

Trigger Species

Biodiversity element	**Giraffe**
Estimated change	Population increases
Justification for change	This species is now considered vulnerable due to population declines throughout its African range. Habitat protection, prevention of meat poaching within Makame WMA and as part of the Tarangire-Manyara ecosystem will protect its range.
Biodiversity element	**African Elephant**
Estimated change	Population remains stable or increases
Justification for change	This species is now considered vulnerable due to population declines throughout its African range. Habitat protection, prevention of ivory poaching within Makame WMA and as part of the Tarangire-Manyara ecosystem will protect its range.
Biodiversity element	**African Wild Dog**
Estimated change	Population remains stable or increases
Justification for change	This species is now considered endangered due to rapid population declines throughout its African range. Habitat protection, protection of food source, prevention of destruction of dens with young (where it is most susceptible) within Makame WMA. This wide-ranging species is moving throughout the Tarangire-Manyara ecosystem.
Biodiversity element	**Beisa Oryx**
Estimated change	Population remains stable or increases
Justification for change	This species is now considered vulnerable due to rapid population declines throughout its African range. Habitat protection, prevention of poaching within

	Makame WMA. This wide-ranging species is moving throughout the Tarangire-Manyara ecosystem however Makame has resident populations.
Biodiversity element	**African Lion**
Estimated change	Stable population
Justification for change	This species is now considered vulnerable due to rapid population declines throughout its African range. Habitat protection, protection of food source, prevention of poaching and retaliatory killing within Makame WMA. This species is and moving throughout the Tarangire-Manyara ecosystem although resident populations occur.
Biodiversity element	**African Leopard**
Estimated change	Stable population
Justification for change	This species is now considered vulnerable due to population declines throughout its African range. Habitat protection, protection of food source and prevention of poaching within Makame WMA. This species is resident within the WMA.

APPENDICES

Appendix 1: Stakeholder Identification Table

Stakeholder	Role
Kiteto District Government	Mutual support and ongoing development activities of mutual interest and benefit to the communities and WMA governance structure.
Tanzania Wildlife Authority (TAWA)	Provides the administrative and regulatory framework with-in which the WMA operates.
The Honeyguide Foundation (HF)	Active in the WMA coordinating human-wildlife conflict mitigation and reduction and Village Game Scout training including anti-poaching activities
The Nature Conservancy (TNC)	Acts in a Coordination role between partners in the WMA and greater landscape as well as provides technical assistance and advice to the project developer
Tourism Outfitters	Facilitating tourism activities and maintaining tourism infrastructure including roads and accommodations with-in the WMA, contribute funds to WMA and stand to benefit financially from improved resource management with-in the WMA
Ujamaa Community Resource Team (UCRT)	Active in the WMA in the capacity of securing and maintaining land rights, and facilitating community training including around governance, financial accountability and gender issues.
Wildlife Conservation Society (WCS)	Technical team leading research and studies inside the WMA, Makame Savannah REDD and surrounding area with a specific scope of wildlife related data.

Appendix 2: Project Activities and Theory of Change Table

ACTIVITIES	OUTPUTS	OUTCOMES	IMPACTS	HUMAN IMPACTS
TARGET 1				
Anti-poaching/illegal grazing	Increased law enforcement	Increased security of land	Protection and conservation of natural resources in WMA	Improved provision of ecosystem services (medicinal plants, reduced dust levels, reduced erosion, prevention of siltation of water holes and dams)
	Increased patrol hours and coverage	Decreased poaching and illegal grazing		Especially adequate pasture for livestock
Marking boundaries with signs	Community understanding of resource management plan and zone boundaries	Better pasture quality/quantity		Sustainable and conflict free pastoralism
	No deforestation in project area	Carbon stays in forest, community receives carbon revenue		Income from tourism
Conservation awareness campaign	As above	As above		Food security
Establish carbon payment scheme	Financial incentive for community to conserve the forest	No deforestation in the project area		Security and sustainability of livelihoods
		Better adherence to the resource management plan		
TARGET 2				
Develop a business plan	Provides a tourism pathway for WMA	Better managed tourism industry	Promotion of tourism in Makame WMA and natural resource conservation	Increased community resilience
	Better decision making			
Increased hunting tourism	Increase number of hunting tourists	Increased tourism revenue for WMA		Increased employment opportunities, especially favoring youth

		Creation of employment opportunities within communities		Improved provision of ecosystem services (medicinal plants, reduced dust levels, reduced erosion, prevention of siltation of water holes and dams)
		Increased protection of wildlife, less poaching		Revenue source for community development
		Increased incentive to conserve natural resources		
		Diversified income/employment sources		
TARGET 3				
Income/expenditure postings	Create transparent expenditure	Increased confidence in the WMA	Improve livelihoods of Makame WMA communities	Improved quality of life
	Increased trust & confidence in leaders	Greater respect for the resource management plan		Enhanced well-being
	Empowerment of community members over finances			Greater community cohesion
Financial accountability to community	Equitable distribution of community income	Improved service provision		Increased community resilience
		More efficiency in community development projects		Greater stability
TARGET 4				
Review resource management plan	Create more relevant resource management plan	Resource ownership	Secure land rights for WMA and natural resource conservation	Eliminate poverty through resource ownership
Stakeholder agreement on resource management plan	Maintain community resource ownership			
Authenticate resource management plan with government	Ensure stakeholder understanding of the plan			

Share new resource management plan accordingly				
TARGET 5				
Support traditional grazing zones and by-laws	Decreased unlawful grazing and land use	Better availability of graze lands throughout the whole year	Protect and maintain the culture and tradition and natural resource conservation	Security and sustainability of livelihoods
		Improved rangeland health		Food security
		Healthy cows		Wealth
		Increased connectivity for cattle and wildlife across the landscape		Formalization of grazing rights
		Resilience and sustainability of pastoralism		
TARGET 6				
Governance training for WMA leadership	Improved capacity to manage natural resources	Better implementation of the resource management plan	Strengthen governance, improve livelihoods and natural resource conservation	More trust and confidence in leadership and the WMA structure
Governance training for village leaders & comm. members	Improved capacity to manage natural resources	Improved management of the WMA		Improved service provision
Governance training for women's leadership groups	Improved capacity to manage natural resources			Improved livelihoods
Ensure female representation in leadership	Better integration of women into decision making	Consideration of women in community decisions		Empowerment of women
		Empowerment of women		Increased gender equality

Appendix 3: Additional Information

Memorandum of understanding between Carbon Tanzania and Kiteto District and Contract between Carbon Tanzania and Makame WMA

Northern Tanzania Rangelands Initiative
Improving lives. Protecting nature.

Memorandum of Understanding

between

Kiteto District Council
and
Partners of the Northern Tanzania Rangelands Initiative

for collaboration in the

Endangered Ecosystems of Northern Tanzania Project

April 2016 – September 2020

Funded by:	Implemented by:
USAID FROM THE AMERICAN PEOPLE	Ujamaa Community Resource Team; WCS; OIKOS; carbontanzania; Maliasili Initiatives; Tanzania People & Wildlife Fund; Pathfinder International; The Nature Conservancy; HONEYGUIDE

Mkataba huu ni kati ya;

Jumuiya Ya Hifadhi ya Wanyamapori Makame (Makame WMA) na Carbon Tanzania (CT Ltd)

Mkataba huu umeandaliwa chini ya Sheria ya Uhifadhi wa Maliasili Na. 5 ya mwaka 2009, Kanuni ya Hifadhi za Wanyamapori (WMA) ya mwaka 2012, Sheria ya Mpango wa Usimamizi wa Rasilimali na Ardhi za vijiji Na. 5 ya mwaka 1999 na Sheria ya Mikataba ya mwaka 2002.

Tarehe 27 **Mwezi** 05 **Mwaka** 2017

Makubaliano haya ni kati ya:

Carbon Tanzania ni kampuni teule isiyotengeneza faida, ambayo ni sehemu ya Carbon Tanzania LTD, ni kampuni ya Kitanzania iliyosajiliwa chini ya Sheria za Jamhuri ya Muungano wa Tanzania (Kiambatanisho na.1).

Jumuiya Ya Hifadhi ya Wanyamapori Makame (INDEMA Society), kuanzia hapa itajulikana kama **Makame WMA** humaanisha Jumuiya ya Hifadhi ya Wanyamapori Makame na mipaka yake, **kama** ilivyosajiliwa chini ya Sheria ya **Societies Ordinance** 1954 kwa namba za usajili 14307 ya mwaka 2006 (Kitambatanisho na.1).

Mkataba huu unahusu uanzishwaji wa mradi **wa kuepukana na ukataji** miti kwa ajili ya kupunguza utoaji wa hewa ya ukaa na kupunguza matumizi yasiyokuwa endelevu na uharibifu wa ardhi, kuwezesha kuzuia utoaji wa hewa ya ukaa utakaosimamiwa na Jumuiya Ya Hifadhi ya Wanyamapori Makame kwa kuwezeshwa na **Carbon Tanzania.**

1. Nia na Majukumu

Kwa ujumla, madhumuni ya mkataba huu ni kama ifuatavyo:

a) Kuwezesha **Jumuiya Ya Hifadhi ya Wanyamapori Makame** kupata mapato kutokana na mauzo halali ya bidhaa zitokanazo na hewa ya ukaa **ambayo** ni bidhaa zisizo za mbao ya misitu (NTFPs), kutumika kwa manufaa ya kiuchumi na kijamii ili kuleta maendeleo.

b) Mkataba huu umeandaliwa chini ya Sheria ya Uhifadhi **wa Maliasili** Na. 5 ya mwaka 2009, Kanuni ya Hifadhi za Wanyamapori (WMA) ya **mwaka 2012**, Sheria ya Mpango wa Usimamizi wa Rasilimali na Ardhi za vijiji Na. 5 ya mwaka **1999** na Sheria ya Mikataba ya mwaka 2002.

c) Kuboresha hali ya kimazingira na kuhimiza matumizi **endelevu** ya maliasili kwenye **Jumuiya Ya Hifadhi ya Wanyamapori Makame** kutokana na mpango **wa** matumizi bora ya ardhi na sheria ndogo.

d) Kupunguza uzalishaji wa hewa ya ukaa na hivyo kuchangia **katika** juhudi za kuboresha hali ya hewa duniani.

e) Kupunguza matumizi yasiyokuwa endelevu ya misitu, uharibifu unaotokana na shughuli isiyolingana na eneo ambalo mipaka imeshawekwa kama eneo lililohifadhiwa kwa ajili ya matumizi ya kiasili na kiutamaduni na eneo la hifadhi ya malisho ya mifugo *(Ronjo)* kama ilivyokubaliwa na kuidhinishwa kwenye Mpango wa Matumizi Bora ya Ardhi nchini.

f) Kuwawezesha Jumuiya Ya Hifadhi ya Wanyamapori Makame/Jamii kupata mapato ya utoaji wa huduma za hifadhi ya mazingira katika mfumo wa matokeo ya hewa ya ukaa kwa njia ya kuboresha mpango wa matumizi ya ardhi na usimamizi endelevu wa misitu.

1.1 Majukumu ya pamoja na ya jumla

a) Pande zote katika mkataba huu zinatakiwa kuheshimu na kuzingatia ulinzi na usimamizi wa misitu kama ilivyo kwenye eneo la mradi kulingana na makubaliano katika mkataba huu.

b) Pande zote katika mkataba huu zimekubaliana kuzuia shughuli yoyote ambayo ni kinyume na mpango wa matumizi bora ya ardhi ya Jumuiya ya Hifadhi ya Wanyamapori Makame kwa kutumia sheria ndogo.

c) Pande zote katika mkataba huu zitakuwa waangalifu na waaminifukatika kujitoa kwa nguvu zote ili kupunguza kubadilisha matumizi ya maeneo kinyume na malengo ya mradi huu, hasa kutokukubali kubadili ardhi ya Mifugo/Ronjo kuwa ardhi ya kilimo katika maeneo ya karibu na ya nje ya eneo la mradi (Mchakato unaojulikana kama kuvujisha, au Leakage). Iwapo kiwango cha kuvujisha (Leakage) kitandelea kuongezeka kwa wingi nje ya eneo la mradi, hatua hii itasababisha mapato kupungua kwa pande zote.

d) Pande zote katika mkataba huu zitahusika katika kufuatilia kiasi cha hewa ya ukaa inayohifadhiwa au kupotea ndani ya eneo la mradi.

e) Pande zote katika mkataba huu zitahusika katika kufuatilia mabadiliko ya kiuchumi na kijamii katika eneo la **Jumuiya Ya Hifadhi ya Wanyamapori Makame** na maeneo ya jirani kama matokeo ya mpango huu.

f) Pande zote katika mkataba huu zitapitia mkataba huu kwa wakati unaotakiwa na kubadili au kurekebisha malipo ya matumizi kama itakavyohitajika ili kufikia malengo ya mradi.

g) Pande zote katika mkataba huu zitachukuwa hatua kuhakikisha kuwa wanachama wa Jumuiya Ya Hifadhi ya Wanyamapori Makame wanaelewa na kujua majukumu yao kuhusiana na mradi huu na wanapewa nafasi ya kushiriki kikamilifu.

1.2 Majukumu ya Carbon Tanzania

Carbon Tanzania kuanzia sasa itafanya yafuatayo:

a) Kutoa huduma ya kitaalam, mafunzo na msaada kwa **Jumuiya Ya Hifadhi ya Wanyamapori Makame** kama inavyotakiwa kwa mafanikio ya utekelezaji wa pamoja wa mradi wa Hewa ya Ukaa na Misitu, ikiwa ni pamoja na tathmini ya ramani, makazi, kipimo cha bidhaa za Kaboni na taratibu zingine zinazohitajika na **Jumuiya Ya Hifadhi ya Wanyamapori Makame** kukidhi malengo yao ya usimamizi endelevu wa misitu.

b) Kutafuta na kupata wanunuzi sahihi wa bidhaa ya hewa ya ukaa iliyohifadhiwa katika eneo la mradi kama matokeo ya jitihada za **Jumuiya Ya Hifadhi ya Wanyamapori Makame katika kulinda na kuhifadhi mazingira yake.**

c) Kulipa **Jumuiya Ya Hifadhi ya Wanyamapori Makame** dola za kimarekani 3/kwa tani moja ya hewa ya ukaa (CO_2) itakayouzwa lakini kutokana na bei ya soko kutotabirika kwa sasa Carbon Tanzania italipa Jumuiya asilimia 60 % ya bei ya mauzo ya kila tani moja ya hewa ya ukaa (CO_2 ikiwa malengo ya ukataji miti vimefanikiwa kuepukwa kutokana na mpango wa hifadhi ya Wanyamapori na misitu. Iwapo malengo yatafanikiwa, amana zilipwe kwa akaunti ya Jumuiya Ya Hifadhi ya Wanyamapori Makame na fedha hizi zitawekwa kwa kufuata mpango wa malipo ya usambazaji (Kiambatanisho na. 2). Malipo haya yatakuwa yanafanyika mara mbili kwa mwaka (kila baada ya miezi sita (6).

d) Kutoa taarifa (report) kwa **Jumuiya ya Hifadhi ya Wanyamapori Makame** kila baada ya miezi mitatu juu ya maendeleo ya mradi kupitia kamati Kuu na Bodi.

e) Kuajiri Meneja wa Mradi kutoka eneo la Makame WMA na kutoa fursa za ajira na kazi ndogo ndogo kwa watu wa Makame WMA kadri fursa hizo zitakavyojitokeza.

1.3 Majukumu ya Jumuiyaya Hifadhi ya Wanyamapori Makame

Jumuiya ya Hifadhi ya Wanyamapori Makame kuanzia sasa itafanya yafuatayo:

a) Kuhakikisha uboreshajiwa matumizi ya ardhi kwa njia ya kutekeleza Mpango wa Matumizi Bora ya Ardhi iliyopitishwa na kukubaliwa ambayo hulinda eneo la WMA kwa faida ya wanachama wote na vizazi vijavyo.

b) Kushiriki kwa uangalifu katika kuzuia ukataji miti ili kuboresha usimamizi wa misitu, ufuatiliaji na utekelezaji kwa mujibu wa Mpango wa Jumla wa Rasilimali za Asili (Comprehensive resources management zone plan).

c) Kuchukuwa hatua kuhakikisha kwamba wanachama wa Jumuiya ya Hifadhi ya Wanyamapori Makame wanaelewa na kujua majukumu yao kuhusiana na mradi huu na wanapata nafasi ya kushiriki.

d) Kutokuuza hewa ya ukaa kwa mtu au chombo kingine chochote katika ardhi ya Jumuiya ya Hifadhi ya Wanyamapori ya Makame kama inavyolindwa na Mpango wa Matumizi Bora ya Ardhi.

e) Kuhakikisha kuwa taarifa zinazotolewa kwa Carbon Tanzania chini ya makubaliano haya ni za kweli na ni sahihi ili kuijulisha Carbon Tanzania kuhusu mabadiliko yoyote halali.

f) Jumuiya Ya Hifadhi ya Wanyamapori Makame inadhamiria kulinda eneo lake kama ilivyowekewa mipaka kwa ajili ya hifadhi ya malisho ya mifugo (*Ronjo*) na kama inavyoonekana katika Mpango wa Matumizi Bora ya Ardhi pamoja na kutumia vyema eneo hili kama eneo la mradi wa Kaboni.

2. Masharti ya Mkataba

Masharti ya Mkataba yatakuwa kama ifuatavyo:

2.1 Uhalali wa Mkataba

Mkataba huu utatekelezwa kwa kipindi cha miaka 30 (thelathini) itakayoanza baada ya kusainiwa na pande zote mbili. Pande zote zinaweza kuanzisha mjadala ili kubadili au kurekebisha mkataba huu kwa wakati wowote kwa ajili ya kuongeza au kupunguza tarehe ya kumaliza mkataba. Kwa upande utakaopenda kusitisha mkataba ni sharti kutoa kwa maandishi notisi ya mwaka moja (1). Hata hivyo marekebisho yoyote halali au majadiliano mapya ni sharti kuwa itafanyika kwa maandishi na pande zote kuweka saini zao.

2.2 Marekebisho

Mkataba huu unaweza kufanyiwa marekebisho au kuboreshwa kwa maandishi kama pande zote mbili za **Carbon Tanzania na Jumuiya ya Hifadhi ya Wanyamapori Makame** zitakubaliana kwa njia ya kuweka saini (Petition).

2.3 Usuluhishi wa Migogoro

Katika mzozo wowote unaoweza kutokea kuhusiana na mkataba huu, pande zote zitakutana kujadili jinsi ya kutatua mgogoro huo. Ikiwa upande moja utakuwa bado haujaridhika au kama pande zote zitashindwa kufikia makubaliano, watarejea mgogoro wao kwa Kamati ya Rufaa na Malalamiko. Kamati hii itakuwa na watu wafuatao;

1. Mwakilishi au wawakilishi wa Ujamaa Community Resource Team (UCRT)
2. Mwakilishi kutoka Carbon Tanzania.
3. Mwakilishi wa kuchaguliwa kutoka kila moja ya vijiji vinavyoshiriki katika mpango huu.
4. Watu wawili wenye taaluma sahihi watakaochaguliwa na pande zote mbili.
5. Mwakilishi moja kutoka Ofisi ya Mkurugenzi, Halmashauri ya Wilaya ya Kiteto.

Upande wowote utakuwa na haki ya kupeleka mgogoro mahakamani baada ya kushindwa michakato ya hapo juu.

2.4 Masuala yanayozidi uwezo wa binadamu/ Nguvu za kiasili

Katika mkataba huu, hakuna upande utakaohusika kwa kushindwa kutekeleza majukumu yake iwapo kushindwa huko ni kutokana na matokeo ya matendo ya asili kama vile; moto, mafuriko, tetemeko la ardhi na dhoruba, upepo au maafa asilia, vita, uvamizi, vita vya wenyewe, uasi, mapinduzi ya kijeshi au nguvu ya kuondolewa madarakani, shughuli za kigaidi, kutaifisha, serikali kuidhinisha, kufungana, vikwazo, kazi ya mgogoro, mgomo, kufungiwa nje.

Iwapo upande wowote, **Carbon Tanzania au Jumuiya ya Hifadhi ya Wanyamapori Makame** utadai kuwa nguvu za kiasili *(Force majeure)* kama sababu ya kushindwa kutekeleza majukumu yake, utatakiwa kuthibitisha kuwa hatua zinazostahili zilichukuliwa chini ya mazingira ya wakati ule ili kupunguza kuchelewa au uharibifu unaosababishwa na matukio yanayoonekana.

5

Mkataba huu umesainiwa hapa chini na pande zote mbili zinazohusika, Carbon Tanzania na Jumuiya ya Hifadhi ya Wanyamapori Makame na kushuhudiwa leo;

Tarehe 27 Mwezi MAY Mwaka 2017

Carbon Tanzania;

1. Jina MARK BAKER CT LIMITED Cheo P.O. Box 823 ARUSHA Saini

MUHURI

Kwa niaba ya Jumuiya ya Hifadhi ya Wanyamapori Makame;

Mwenyakiti wa Bodi

Jina Lendukushi Kenje Cheo M/Kiti Saini

Katibu wa Bodi

Jina Samwel K. Olelekaa Cheo Katibu wa Bodi Saini

MUHURI

Mashuhuda

Mkurugenzi, Halmashauri ya Wilaya ya Kiteto

1. Jina Jerome K. Kambona Cheo DED Saini

MKURUGENZI MTENDAJI (W)
HALMASHAURI YA WILAYA
KITETO

MUHURI

Mwanasheria, Halmashauri ya Wilaya ya Kiteto

2. Jina E. Ikayuu N. Sumaia Cheo WAKILI Saini

ADVOCATE NOTARY PUBLIC & COMMISSIONER FOR OATHS

Mwenyakiti wa WMA ya Makame

1. Jina KUNDAYO LENGUMA Cheo M/KITI Saini

MUHURI

6

Kiambatanisho na. 1:

Certificate of Incorporation CT Ltd.

TANZANIA

Certificate of Incorporation

I HEREBY CERTIFY THAT

CT LIMITED

is this day incorporated under the Companies Act, 2002 and that the Company is Limited.

Given under my hand at Dar es Salaam this 30TH day of AUGUST TWO THOUSAND AND THIRTEEN

Certificate of registration So. No.14307

THE UNITED REPUBLIC OF TANZANIA

CERTIFICATE OF REGISTR

REGISTRY OF BUSINESS APPLICATIONS

7

Kiambatanisho na 2: Mgawanyo wa Malipo kutoka Carbon Tanzania

20% - WMA Management

40% - Villages of Makame, Ndedo, Irkiushioibor, Katikati na Irng'abolo

30% - Protection of Wildlife and Forest Resources

10% - Halmashauri ya Wilaya ya Kiteto (Carbon Tanzania italipa kwenye akaunti ya Halmashauri ya Wilaya)

8

Appendix 4. Biodiversity data.

Project area bird species (Tanzania Bird Atlas Square 3604D)

Atlas list for Makame square 3604D : 318 species from 4164 records at 23.02.2017:

/ = presence; X = suspected breeding; B = eggs in nest

RAW DATA, NOT FOR PUBLICATION PURPOSES

contact tzbirdatlas@yahoo.co.uk

Card No	first obs	locality	bno	species	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	tot rec
		Total		318	118	151	170	232	90	115	101	123	58	0	65	109	4164
743	135	Makame	1	Ostrich	/	/		/			/				/		5
589	135	Waterhole 25km sth L	4	Little Grebe				/	/		/	/					6
9093	10	Makani village	25	Grey Heron			/										1
2855	135	Laivera	27	Black-headed Heron				/									1
643	135	Makami	30	Squacco Heron				/									1
643	135	Makami	31	Rufous-bellied Heron				/	/								2
743	135	Makame	32	Cattle Egret	/				/								2
589	135	Waterhole 25km sth L	33	Green-backed Heron				/									1
589	135	Waterhole 25km sth L	34	Great White Egret				/									1
589	135	Waterhole 25km sth L	38	Yellow-billed Egret				/									1
9071	10	Ndedo to Kibaya	42	Hamerkop		/			/								4
9052	10	sq boundary	45	White Stork			/										1
9052	10	Waterhole	48	Saddle-billed Stork			/										1
9052	10	waterhole	60	White-faced Whistling Duck			/		/								2
743	135	Makame	61	Egyptian Goose	/	B		/									7
9983	10	Makame sq	76	Southern Pochard					/								1
9093	10	MS Camp1	79	Spur-winged Goose			/	/									2
1518	246	Ngumumwa	80	Knob-billed Duck		/	/	/	/								10
743	135	Makame	83	Secretary Bird	/			/		/							3
9093	10	MS Camp 13	85	White-backed Vulture			/	X			/	/			/		5
9951	10	Ndedo village	90	White-headed Vulture											/		1
9093	10	MS Camp 1	93	Pallid Harrier		/											1
9052	10	Kibaya rd	96	Gymnogene			/	/			/					/	6
743	135	Makame	98	Brown Snake Eagle	/		/	/		/	/	/			/		12
643	135	Makami	100	Black-chested Snake Eagle				/				/	/			/	4
743	135	Makame	101	Bateleur	/	/	/	/	/	/	/	/			/		27
9093	10	MS Camp 2	107	Little Sparrowhawk			/	/									2
9052	10	Kibaya rd	109	Ovambo Sparrowhawk			/										2
9093	10	MS Camp 2	111	African Goshawk			X	/									5
2443	10	Ir - MSteppe raptor tr	114	Steppe Eagle		/											1
9093	10	Ndedo rd	115	Lesser Spotted Eagle		/											4
743	135	Makame	116	Tawny Eagle	/	/	/	/	X	/	/	/	/		/		17
648	135	Makame	117	Verreaux's Eagle						/	/						4
9093	10	MS Camp 2	118	Wahlberg's Eagle			/										2
743	135	Makame	119	Grasshopper Buzzard	/												1
743	135	Makame	120	Augur Buzzard	/			/		/			/				4
9093	10	MS Camp 1	122	Common Buzzard		/											2
9071	10	Ndedo to Kibaya	128	African Hawk Eagle		/		/		/		/					6
9093	10	MS Camp 1	129	Lizard Buzzard		/											1
743	135	Makame	131	Gabar Goshawk	/	/	/	/	/	/	/	/	/		/		22
2855	135	Laivera	132	Dark Chanting Goshawk				/									1
743	135	Makame	133	Pale Chanting Goshawk	/	/	/	/	/	/	/	/	/		/	/	52
9093	10	MS Camp 13	134	Martial Eagle			/					/					3
743	135	Makame	138	'Black Kite'	/												1
9093	10	MS Camp 2	140	Honey Buzzard			/	/									2
589	135	Waterhole 25km sth L	142	Black-shouldered Kite				/	/		/	/				/	8
2378	135	Makami	148	Lanner Falcon				/		/	/						4
9093	10	MS Camp 13	156	Lesser Kestrel			/										1
9071	10	sq boundary cam	158	Peregrine Falcon		/				/	/						3
9092	10	Ndedo rd - Hoops	160	Hobby		/		/									6
743	135	Makame	163	Pygmy Falcon	/	/		X		/		/				/	10
589	135	Waterhole 25km sth L	166	Harlequin Quail				/									1
9093	10	MS Camp 13	170	Coqui Francolin			/			/							2
743	135	Makame	171	Hildebrandt's Francolin	/			/		/	B	X					8
743	135	Makame	175	Yellow-necked Spurfowl	/	X	/	/	/	/	B	X	/		/	/	39
743	135	Makame	182	Crested Francolin	/	/	/	/		/	/	/	/		/	/	30
743	135	Makame	187	Vulturine Guineafowl	/	/	/	/	/	/	/		/		/	/	32
743	135	Makame	188	Crested Guineafowl	/	/	/	/		/	/						11
2378	135	Makami	189	Kenya Crested Guineafowl				/									1
743	135	Makame	190	Helmeted Guineafowl	/	/	/	/		/	/	/	/		/	/	26

Appendix 5: Makame Wildlife Management Area Resource Management Zone Plan (Resource Management Plan) (RMP)

MAKAME WMA

WILDLIFE MANAGEMENT AREA

RESOURCE MANAGEMENT ZONE PLAN

2017-2022

Made under Regulation 36(1), and the Sixth Schedule of the WMA Regulations (2012)

by

The Council,
Makame WMA,
P.O. Box 1, Kibaya – Kiteto, Manyara,
Phone No: +255 (0) 746 249 758.

August, 2017.

APPROVAL PAGE

The Director of Wildlife (*hereinafter referred to as the Director*) and the *"Makame WMA"* (MWMA) *(hereinafter referred to as the Authorised Association)* and jointly referred to as "the Parties", and in the singular as "a Party", undertake:

RECOGNISING laws of the land, the roles and responsibilities of the parties and with reference to the management of WMAs (As outlined in the Wildlife Conservation (WMA) Regulations, 2012),

CONSCIOUS of the significance and purpose of establishing and managing the "*Makame Wildlife Management Area*", (hereinafter referred to as the WMA), as in the context of Tanzania,

DESIRING to promote biodiversity, conservation and sustainable socio-economic development of the WMA, for poverty reduction of the local communities surrounding the WMA,

HEREBY AGREE AS FOLLOWS:
The Director hereby grants approval of the Resource Management Zone Plan (RMZP), as the basis upon which the Authorised Association shall manage sustainably the wildlife and other natural resources in the WMA. Implementation shall be according to the conditions governing the AA and the User Rights as accorded by the Director.

This RMZP shall come into effect from the date of signing and shall be considered to operate for a period of 5 years, subject to a revision taking place from time to time. Any such revision, shall be forwarded to the Director for approval, prior to implementation of any proposed changes.

SIGNED SEALED AND DELIVERED
This RMZP is hereby approved for implementation with the common seal of the Wildlife Division by the Director of Wildlife, at Dar Es Salaam, this ……. Day of ……...2017.

……
Signature, Director of Wildlife,
Nyerere Road, Ivory Room,
PO Box 1994,
Dar es Salaam.

Directors
Seal

FOREWORD

Makame WMA is one of the membership based association called Makame WMA. This was a short form of the three original villages – Irkiushioibor, Ndedo and Makame. The Association was first formed and registered on 18th of May, 2006, as a Community Based Organisation (CBO) under the Societies Ordinance Act with

Registration No. 14307. The December 2002 Wildlife Conservation (Wildlife Management Areas) Regulations, of the Wildlife Conservation Act, 1974, declared Makame Wildlife Management Area (WMA) one among 16 "Pilot Wildlife Management Areas" listed in the Fourth Schedule. Makame WMA was accorded 36 months, from 2002 to 2005 before being registered in 2006 as "an Authorised Association".

Therefore accordingly the Makame WMA Constitution was reviewed and aligned in 2017 to the format prescribed in the First Schedule of the WMA Regulations. This Resource Management Zone Plan (RMZP) is prepared in line with Schedule 6 of the Wildlife Conservation Regulations 2012.

This RMZP is a compilation of all studies to date and expresses the wish and aspirations of the current 5 participating villages to develop the designated area as a WMA for the purpose of generating sustainable revenue from wildlife hunting, photographic and cultural tourism. These earnings shall be put back to the socio-economic advancement of all its members.

HEREBY AGREE AS FOLLOWS:

The Makame WMA hereby agrees to undertake to manage the wildlife resources in the WMA according to this RMZP and User Rights permit.

SIGNED AND DELIVERED:

With the Official Stamp of the MWMA, at Kibaya/Kiteto, this ……. Day of …...… 2017

……..
Signature, Chairman,
Makame WMA
P.O. Box 1, Kibaya – Kiteto, Manyara.

MWMA
Seal

ACRONYMS

AA	Authorised Association
AOP	Administrative and Operations Program
AOPB	Annual Operation Plan and Budget
BoT	Board of Trustees
CCDB	Community Conservation and Development Bank
CDP	Community Development Policy
EIA	Environmental Impact Assessment
EIMZ	Eng'orore/Ilaramatak Management Zone
MAKAME WMA	Irkiushoibor, Ndedo and Makame
FMP	Fire Management Plan
GMP	General Management Plan
LGRP	Local Government Reform Programme
MMZ	Manyiho Management Zone
MWMA	Makame Wildlife Management Area
MZP	Management Zone Plan
MZS	Management Zone Scheme
NGOs	Non-Governmental Organizations
NRMP	Natural Resources Management Program
NSGRP	National Strategy for Growth and Reduction of Poverty
RDS	Rural Development Strategy
RMZ	Ronjoo Management Zone
RMZP	Resource Management Zone Plan
VEO	Village Executive Officer
VLUP	Village Land Use Plan
WEO	Ward Executive Officer
WMA	Wildlife Management Area
WMAs	Wildlife Management Areas
WPRP	Wildlife-People Relations Program
VUDRP	Visitor Use Development and Revenue Program

EXECUTIVE SUMMARY

In order to implement Wildlife Policy (1998) and its revision of March 2007 the Government developed and approved several strategies including development and approval of the Wildlife Conservation (Wildlife Management Areas) Regulations in 2012. To guarantee sustainable conservation of wildlife resources in local community lands and safeguard the interests of traditional communities, the Wildlife Conservation (Wildlife Management Areas) Regulations 2012 calls for the development of a Resource Management Zone Plan (RMZP) of a WMA. A RMZP, which operates for five years only, demands review soon after its expiration in order to facilitate re-application of user rights by the authorised Associations.

Reflecting these policy and legal requirements, the Authorised Association (AA) of the five villages (Makame, Ndedo, Katikati, Ng'abolo and Ilkiushioibor) responsible for the Makame Wildlife Management Area (MWMA) organized seven review workshops in July and August 2017 to analyse information data sheet of the prospective WMA and develop a comprehensive Resource Management Zone Plan. Thus this document is a result of the workshops organised by the AA and review workshops to accord the RMZP with Wildlife Conservation Act no. 5 of 2009.

The RMZP is a document that sets the basic management and development philosophy of the MWMA, provides current image of the reality, defines the desired future of the MWMA and provides for the means of changing the negative situation and achieving the desired future over a period of 5 years (2017-2022).

The current RMZP encompass planning and management issues identified during appraisal workshops including reaffirmation of Vision and Mission of Makame WMA. In the participatory workshop, vision was reconfirmed as a reason or reasons for which the area is set aside and exists as a proposed Wildlife Management Area. Stakeholders agreed the MWMA vision reads "an integrated, well managed and self-financing protected area in which nationally-important biodiversity is protected, essential ecological processes are sustained and local people and stakeholders fully support and tangibly benefit from wildlife conservation efforts in the area". Mission of the Society continues to exist as "to sustainably manage the WMA, free of conflict, to maximise an equitable benefit sharing. This includes social services, education and economic benefits to its village members, derived from revenues from joint venture investments, business developments and income generating activities (IGAs)".

The rest of the documents accounts significance of Makame WMA comprising zoning which, describes activities that can and cannot occur in each area of the prospective WMA, the rationale behind each decision on uses and levels of developments and sets limits of acceptable use and change. Besides, an Environmental Impact Assessment (EIA) section of the RMZP is included to highlight the impacts of proposed actions for Makame WMA which, includes revenue, biodiversity and general ecosystem conditions. The RMZP proposes Environmental Impacts Assessment (EIA) for all new physical developments in the MWMA, as a direct mitigation measure. Also the RMZP recommends immediate review of general village land use in order to eliminate conflicting uses and carry out studies before the implementation of some physical developments, as feedback mitigation measures.

TABLE OF CONTENTS

APPROVAL PAGE **2**
FOREWORD **2**
ACRONYMS **4**
EXECUTIVE SUMMARY **5**
TABLE OF CONTENTS **6**
1 POLICY **8**
1.1 National Sector Policies and WMAs 8
1.2 Local Government Policy 8
1.3 Benefit Sharing 8
1.3.1 MWMA Benefit Sharing Guidelines *8*
1.3.2 Village Membership Benefits *9*
2 GENERAL DESCRIPTION **10**
2.1 General Information of Villages 10
2.2 Location, Boundaries and size of the Area 10
2.3 Physical Features, Geology, Soils and climate 10
2.4 Wildlife and vegetation Communities 11
2.5 Population Growth/Demography 11
2.6 Achievements by MWMA on the road to become an AA/WMA 11
2.6.1 MWMA Legally Constituted as a CBO. *11*
2.6.2 Strategic Plan: 2006-11 ..... *12*
2.6.3 The Resource management Zone Plan 2017-2022. ..... *12*
3 OUTSTANDING RESOURCE VALUES, PURPOSE AND SIGNIFICANCE OF THE WILDLIFE MANAGEMENT AREA **13**
3.1 Outstanding resource values 13
3.2 Purpose of the WMA 14
3.3 Vision 14
3.4 Mission 14
3.5 Significance of the WMA 14
4 SWOT ANALYSIS OF MANAGEMENT ISSUES **15**
5 MANAGEMENT STRATEGIES **19**
5.1 Institutionalisation and capacity building of Makame WMA 19
5.1.1 MWMA Secretariat *19*
5.1.2 MWMA Leadership *19*
5.2 Protection of WMA resources 19
5.3 Leaning from other WMA pilot areas 20
5.3.1 NGO Partnership *20*
5.3.2 IGA/ALS and Micro-enterprise Development *20*
5.3.3 Business Partnerships *20*
5.3.4 Infrastructure and communication development *20*
5.3.5 MWMA Monitor Business Plan Implementation *21*
5.3.6 Technical Assistance *21*
5.4 Proposed studies 21
5.4.1 Game Census *21*
5.4.2 Forest Resource Studies *21*
6 MANAGEMENT ZONING **22**
6.1.1 Settlement Management Zone – Manyiho (Makazi ya kudumu) ..... ***Error! Bookmark not defined.***
6.1.2 Ronjoo Management Subzone (Makazi ya muda) ..... ***Error! Bookmark not defined.***
6.1.3 Hunting Management Subzone (Eng'orore/Ilaramatak – Uwindaji/Ufugaji) *22*

7.1.1 Visitor use, development and revenue program (VUDRP) 27
7.1.2 Administration and Operations Program (AOP) 28
7.1.3 Wildlife-people relations program (WPRP) 29
7.1.4 Natural resources management program (NRMP) 30

8 ENVIRONMENTAL IMPACT ASSESSMENT 32

8.1 IMPACTS OF ACTIVITY 32
8.2 SOCIO-ECONOMIC AND CULTURAL VALUES OF ACTIVITY 32
8.3 MANAGEMENT OBJECTIVES AND RESOURCE PROTECTION 32

9 IMPLEMENTATION OF THE RMZP 33

9.1 RMZP IMPLEMENTATION REQUIREMENTS 33
9.1.1 The Relationship of the MWMA and the Public: 33
9.1.2 The Internal Functions of the Society 34
9.1.3 Evaluation and Reviews 35
9.1.4 Monitoring & Evaluation of Activities 35
9.1.5 Financial Management 35

10 BIBLIOGRAPHY 36

11 LIST OF APPENDICES 37

ANNEX 1: COPY OF GOVERNMENT NOTICE DECLARING MWMA AS WMA 38
ANNEX 2: COPY OF CERTIFICATE OF AUTHORISATION OF MWMA: 39
ANNEX 3: MINUTES AND LIST OF PARTICIPANTS INVOLVED IN PLANNING PROCESS 40
ANNEX 6: OFFICE BEARERS OF THE SOCIETY, THEIR QUALIFICATIONS AND TENURE 62

1 POLICY

1.1 National Sector Policies and WMAs

In the late 1990's, Tanzania went through a complete reform of its policies so as to deal with critical management issues facing natural resources and placing greater emphasis on Community Based Management of Natural Resources (CBNRM). These included revisions of the Wildlife Policy (1998), the Environment Policy (1997), the Forest Policy (1999), the Tourism Policy (1999), and Beekeeping Policy (1998). Christophersen and Jambiya (2002) note that the common thread in all of these revisions are: (a) to utilize natural resources efficiently and sustainably, (b), to include local communities in the process, and (c) to address issues of increased benefits accruing to local communities. All this adds up to a much stronger people orientation in natural resource management policies and sets the stage for the creation of Wildlife Management Areas (WMAs) and is the basis for this Resource management Zone Plan (RMZP). Besides the national policy context, this RMZP is embedded in the framework of the national development vision, which amongst other things, aspires to graduate Tanzania from a least developed country, to a middle-income country by 2025. Tanzania is expected to portray high quality livelihood, through sustainable and shared growth, free from poverty and gender inequalities, politically stability, with leaders and public servants held accountable through good governance, well-educated and a strong competitive economy. The economic benefits to communities from managing WMAs as a means of generating revenue for local development, support this vision.

1.2 Local Government Policy

The Local Government Act of 1982, empowers District Councils to implement economic activities and ensure economic growth and development in a District. Responsibility is delegated to the Village Government, as the grassroots organ. People must be involved in planning, decision making, implementation and M&E, on all matters pertaining to development. WMAs conform well to this policy, and MWMA is charged with local development responsibility on behalf of the members.

1.3 Benefit Sharing

Once User Rights are obtained, this RMZP assumes that the AA will enter into agreements for the specified commercial operations (ie hunting and photo tourism) of the WMA, subject to approval by the Director. Anticipated is that the Director shall collect normal fees for such operations as pertains to Hunting Block Fees, Permit Fees, Conservation Fees, Trophy Fees, Trophy Handling Fees, photographic tourism, etc (As in the Tourist Hunting Regulations, 2010). The 1995 Management Plan for Tourist Hunting suggested a scheme of 50% revenue to go back to community for development projects.

1.3.1 MWMA Benefit Sharing Guidelines

In line with the MWMA Constitution of 2017 the following guidelines shall prevail: The benefit sharing from a WMA shall comply with mechanisms of equitable distribution of costs and benefits, distributed equally for the benefit of Village Members irrespective of size of land or population. Targeted shall be economic development and poverty reduction.

Benefit sharing shall conform with laid down procedures from Wildlife Division and Treasury for annual gross revenues as follows (WMA Regulation 2012):

Capital Fund:	Not less than 15% shall be capital, re-invested for WMA resource development.
Trust Fund:	Not less than 50% shall be directed to member village projects (to be split, 30% for community projects and 20% placed on fixed deposit to earn interest as a buffer for contingency, emergency, etc).
Operations Fund:	Not less than 25% shall be used to strengthen the AA (ie operations, Secretariat support, MWMA meetings, training, etc).

Use of funds shall conform with Council approved annual budget and work plans, in consultation with Village Assembly, after payment of costs of operations, taxes, dues and other contributions.

1.3.2 Village Membership Benefits

Every Village Member of the Society has a right to:

- Equitable, but regulated access to all resources, services and benefits rendered by the Society.
- Contribute ideas to the development of the Society through the Village representative, the elected CBO Council Member.
- Contest and elect leadership to the Society through its elected CBO Council representatives.
- Get feedback on the development of the Society including progress reports, financial statements and income, and expenditure reports on use of Society's funds.
- Residents of member villages shall get priority on any employment opportunity within the Society circles, provided they hold the required qualifications and experience.
- Maximise the sustainable use of natural resources outside the WMA core wilderness area in accordance with the laws that govern the conservation and management of such resources.
- Remove or change those people who represent the Member Village, upon being satisfied that the Village representative is not acting to the interests of the members of the village. The certified minutes of the village meeting that replaces any Council representative shall have to be submitted to the General Meeting of the Society for verification as to the authenticity of the meeting. The General Meeting will verify that the change or removal of the specified representative was decided by majority vote at a duly convened Village Assembly

2 GENERAL DESCRIPTION

2.1 General Information of Villages

The Makame WMA, also known as Makame WMA is made up of 5 villages with a population of 14,854 people, whose distribution is listed in Table 1. More details of each Village are included in the individual Land Use Plans (LUP) and the data sheets attached to the AA/WMA application.

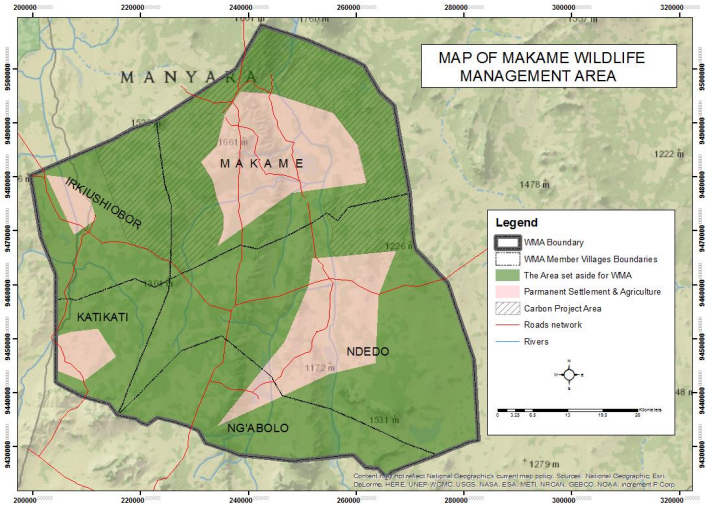
The member villages are distributed within one Division, Kiteto District in Makame, Manyara Region. The villages that make up Makame WMA are Irkiushiobor, Ndedo, Ngábolo, Katikati and Makame.

2.2 Location, Boundaries and size of the Area

MWMA Wildlife Management Area belongs to the Community Based Organization (CBO) known as "Makame WMA" (MWMA). The WMA is situated in Northern Tanzania, between latitudes 5º50'26.09'' and 5º51'38.14'' South, and longitude 36º47'23.35'' and 36º50'58.94 East. It is situated about 100 kilometres Northwards from Kibaya Kiteto.

The total area of the WMA is 3643 km^2 (364322 Hectares) (see Map 1). The Society comprises 5 registered villages, who own and have set aside the 364322 hectares of village land as the core area for wilderness and livestock. The remaining 1027 km^2 of village land is established as a surrounding buffer zone for habitat, livelihood and subsistence use (ie cultivation, fuelwood, livestock, hunting, etc).

MAP 1: Makame WMA



2.3 Physical Features, Geology, Soils and climate

The altitude of the area varies between the 1300 and 1470 meters above sea level. The area is characterised by varied soils comprising sand, red loam, clays and sand gravels. The geology of the area is dominated by sedimentary rocks. The climate is

semi-arid with annual rainfall ranging between 500mm to 750mm. Rains are influenced by Eastly winds which brings both short and long rains between October – December and February – May respectively. Temperature is usually high and averages 25 to 30ºC.

2.4 Wildlife and vegetation Communities

Tanzania's largest WMA, Makame WMA is composed primarily of open woodlands and mixed shrubland. It contains an important assemblage of wildlife, including elephant, lion, buffalo, giraffe, leopard, oryx, lesser kudu, eland, gerenuk, klipspringer, hartebeest, bushbuck, zebra, waterbuck, wildebeest, reedbuck, hyena, Thomson's and Grant's gazelle, warthog, impala, dik-dik, and wild pig.

2.5 Population Growth/Demography

Data provided in the District Profile Document 2015 show the following population size, and distribution between gender groups and number of households per Village (Table 1). Population growth is estimated at 3.6% annually for all villages based on Population Census data for Kiteto.

Table 1: Population destribution in Makame WMA

No	Village	No. of Household	Males	Females	Total population
1	Makame	1873	1683	2284	3,967
2	Irkiushiobor	1360	1411	1450	2,861
3	Katikati	1375	1397	1526	2,923
4	Ngábolo	823	811	855	1,666
5	Ndedo	1653	1534	1903	3,437
Total		**7084**	**6836**	**8018**	**14,854**

2.6 Achievements by MWMA on the road to become an AA/WMA

2.6.1 MWMA Legally Constituted as a CBO.

In accordance with the First Schedule of the WMA Regulations (2002), Makame WMA shall be governed by its Constitution which also contains MWMA Bylaws and Codes of Conduct. To date, the MWMA has village by village established legal rights by the community of 5 villages and has legally constituted and registered the Society as a CBO on18th of May, 2006. Elections of the 48 MWMA Council Representatives and appointment of the 12 Executive Committee members was held in 2006. In the member villages 2 committees have been set up, notably, the 9 member Village Natural Resources and Environment Committees and the 6 member Village Community Development Committee.

2.6.2 Strategic Plan: 2017 - 2022

In August 2017 all members of the MWMA Council agreed to a common Strategic Plan, which has now become the basis for management and development of the Society, a process facilitated by TNC/UCRT. This Strategic Plan provided a solution to overcome some of the problems, such as the land dispute due to conflict land uses

e.t.c. This Strategy is incorporated in the RMZP 2017 - 2022, which hereafter becomes the implementation tool of the Society.

2.6.3 Strategic Plan: 2006-11

In October 2006 all members of the MWMA Council agreed to a common Strategic Plan, which has now become the basis for management and development of the Society, and for support by UCRT. This Strategic Plan provided a solution to overcome some of the problems at that time, such as the land dispute due to conflict land uses. This Strategy is incorporated in the RMZP, which hereafter becomes the implementation tool of the Society.

2.6.4 The Resource management Zone Plan 2017-2022.

This RMZP is a composite of earlier studies, baseline surveys, animal census, natural resource studies, etc. It is seen as the implementation tool of the MWMA objectives for inside the core wilderness area and the activities are summarised in Resource Management and Zoning section. It takes up from the Strategic Plan and is the legal basis for user right application and for the functioning of the WMA. It may be subject to revisions every 5 years to accommodate developments and changes, but essentially highlights a 5 year progression in the development of the site.

3 OUTSTANDING RESOURCE VALUES, PURPOSE AND SIGNIFICANCE OF THE WILDLIFE MANAGEMENT AREA

3.1 Outstanding resource values

The MWMA WMA offers a number of unique African safari adventure experiences that cannot be had in other protected areas as well as natural resources which under sustainable management can provide income to the member villages. These include:

- Photographic safaris,
- Tourist hunting safaris,
- Scenic hill peaks,
- Walking safaris,
- Night drives with spotlight to see nocturnal predators,
- Tours to cultural shows and Masaai dancers
- Camping sites,
- Authentic caves with ancient drawings,
- Rituals sites,
- Traditional meat camps.

Photo-Tourism: The relatively lower game numbers in the core area preclude MWMA from having a competitive advantage against game parks like Tarangire National Park. However, the Makame landscape has the required animals and wilderness habitat to attract photo-tourism, with a difference aimed at more wilderness adventure. The situation of Makame WMA within 1and half hour from Kibaya, 1 hour from Babati and about 3 hours from Kilimanjaro International Airport furthermore enhance the value of the area for tourism. The area also has potential to attract tourism based on the fact that the modern tourist would like to know that the facility he is visiting has direct benefits accruing to the the community. This would add to the appeal and could contribute additional resources in the form of tourist donations.

Hunting Tourism: The wildlife density in Makame WMA WMA has a sufficient number to allow hunting tourism with scope to grow over time. The highly prized kudu are abundant and so do other plains animals which could add an advantage. The proposed hunting packages initially would be limited to 100 days, with scope in 5-10 years to grow to 180-200 days.

Scenic hills and walking safaris: The Ndikira hill offers a panoramic view of Makame plains and could be ideal for walking safaris and especially for rock lovers. The visitors we had for such a walk consider it to be a spectacle and likely to be promising for more tourists, who may also like to camp along the way.

Night Drives: Not permissible in a protected area, night drives with spotlights offer scope to see the shyer, nocturnal predators along the river frontage. The area would lend itself to limit such drives so as not to scare the animals too much.

Attractive Sites: Makame WMA WMA has a number of sites that could become day trips for clients on photo or tourist hunting. Amongst these are; a stony mountains that

allows panoramic view of the area (*Ndikira hills*); sites for traditional meat camps (orpul); stone ancient drawings; bee caves; swamps on the north eastern side of the WMA.

Cultural Shows: The villages in MWMA are dominated by Maasai cultures. Each could put on cultural shows (like Masaai dancers) as additional entertainment for the visitors. This ethnic addition to activities could help to make greater contact between community and tourist, and listed below are traditions which could have cultural tourism value.

Traditional herbs: Potential exists for collecting medicinal plants, fruits from *ilama* and Baobab, thatching grass.

3.2 Purpose of the WMA

When asked to decide if the WMA should be managed for food, where the community derives direct economic gains or, whether to operate as a business, where the revenue is made available to the community for development projects like schools, clinics, water supply, etc, the MWMA Council opted for the latter. The Constitution of the MWMA reflects that the WMA must generate revenue for village development funds.

The purpose of the MWMA is to be seen as a bank account for the community where the protection of the resource will yield dividends in the form of income from investments and tourism lease or concession on the site. Revenue from this rent will go to pay operational costs of anti-poaching, management, maintenance, community development, etc and the surplus shall be given to the villages as a development fund for priority Community Development Plans. Proposed is to retain the revenue from the state (ie. the share on concession and trophy fee), as part of the development fund. The rest shall be for administration and operations.

3.3 Vision

An integrated, well managed and self-financing protected area in which nationally-important biodiversity is protected, essential ecological processes are sustained and local people and stakeholders fully support and tangibly benefit from wildlife conservation efforts in the area.

3.4 Mission

To sustainably manage the WMA, free of conflict, to maximise an equitable benefit sharing. This includes social services, education and economic benefits to its village members, derived from revenues from joint venture investments, business developments and income generating activities.

3.5 Significance of the WMA

Makame WMA is adjacent to a significant part of the Tarangire Ecosystem. This area is recognized as one the country ecological "hot spots" for wildlife biodiversity. Makame WMA is likely to have a role as corridor connecting Tarangire, Simanjiro and Kiteto ecosystem.

4 SWOT ANALYSIS OF MANAGEMENT ISSUES

The environmental scanning was conducted to understand the internal and external macro-environments of MAKAME WMA. The internal analysis identified MAKAME WMA's strengths and weaknesses and the external analysis revealed the opportunities and threats. A profile of the Strengths, Weaknesses, Opportunities and Threats (SWOT) was generated by means of a SWOT analysis. Results of the environmental scan are summarized under tables below.

Table 2. Strengths and weaknesses

Key results areas of the AA	Strengths	Weaknesses
WMA conservation, hunting and Tourism	MAKAME WMA has the legal mandate for WMA	Inadequate investments,
	Legal hunting,	Inadequate capacity in human resources and equipment,
	Carbon sequestration,	Over dependence on hunting tourism,
	Camp sites including traditional meat camps,	Poor infrastructure and communication network,
	Ritual sites,	Inadequate social capital,
	Experienced staff,	Incomplete biodiversity inventory,
	Availability of natural resources, historical sites and favorable climate,	Lack of WMA demarcation,
	Unique and diverse wildlife and landscapes	Lack of clear definition of *ronjo* and hunting zones
	Pasture resources including salt licks,	Financial instability,
	Strong and good leadership	Technological inaccessibility,
	Good relationship with stakeholders	Lack of business plan.
	Local and international goodwill and recognition	Inadequate investments,
	Local culture	
	MAKAME WMA has the legal mandate for tourism	Over dependence on hunting tourism,

	development	
	Laws and regulations that support WMA.	Insufficient support for village game scouts (VGS)
Livestock, crop production and community development	Local community's integrity and unity,	Inadequate investments for livestock/crop/social services,
	Innovative and industrious society,	Inadequate capacity in human resources and equipment,
	Local and international goodwill and recognition	Over dependence on livestock production,
	Availability of natural resources including forests, pasture resources	Inadequate infrastructure and telecommunication network,
	CBOs	
	Land availability and agricultural resources	Inadequate social services e.g. health, education, water, energy etc.
	Strong and good community leadership	Limited innovation in agricultural economy,
	Good relationship with stakeholders	Lack markets for livestock and crops produce,
	Local and international goodwill and recognition	Inadequate livestock services,
	Local culture,	Lack of village by-laws.
	Traditional wells,	Inadequate investments,
	Road network,	Inadequate capacity in human resources and equipment,
	Health facilities e.g. dispensary,	Over dependence on livestock production,
	Livestock services e.g. crush and dips,	Inadequate infrastructure and telecommunication network,
	Education services	Inadequate social services e.g. health, education, water, energy etc.

Table 2. Opportunities and threats

Key results areas of the Authority	**Opportunities**	**Threats**
WMA conservation, hunting and tourism	Located in Ecosystem Area (Kiteto-Simanjiro-Tarangire ecosystem),	Land conflicts,
	Existence of resources like wild animals, geographical scenery, historical sites,	Political interventions/interference,
	Political Stability,	Farming/cultivation in WMA,
	Being among 16 pilot Wildlife Management Areas,	Poaching/poachers,
	Support of local communities/people,	Disease outbreak,
	Potential to attract financial support and other resources from development partners,	Drought/Climate change,
	MAKAME WMA commitment,	Increase of human population and activities,
	Payment for Ecosystem services (carbon project),	Unpredictable world economy,
	Pro-WMA local communities,	Land conflicts,
	Prime hunting and tourism location,	Political interventions/interference,
	Co–existence amongst human, wildlife and livestock,	Encroachment,
	Potential for further tourism development	Environmental degradation
	Development partners like UCRT, TNC, Carbon Tanzania, Honey Guide Foundation etc.	Illegal immigration
		Rapid population growth
		Rapid livestock population
		Wild animal out migration
Livestock, crop production and community	Political Stability,	Land conflicts,
	MAKAME WMA mandate to support local communities/people,	Political interventions/interference,
	Peace and security,	Disease out break

development	Alternative livelihood strategies,	Drought/Climate change
		Environmental degradation
		Illegal immigration
		Rapid population growth
		Dirty politics
		Rapid livestock population

5 MANAGEMENT STRATEGIES

5.1 Institutionalisation and capacity building of Makame WMA

5.1.1 MWMA Secretariat

To take care of business, the MWMA has to establish and manage a full-time, paid Secretariat, with staff who are accountable and take direction from the Executive. The Secretariat, at present can be considered to be the project management unit. What is needed is for this Unit to become independent, for staff and operations, to be paid from investment earnings, to manage the day-to-day affairs of the Society. This includes taking charge of protecting the resource base, upholding by laws, raising awareness of members' rights and obligations, and ensuring development projects take place as planned. Reporting to the Council, in accordance with a MWMA Staff Terms and Conditions of Service. As a minimum the Secretariat is proposed to consist of a Manager, Protection Staff, Capacity Building Staff, Accounts, and Secretary.

5.1.2 MWMA Leadership

To establish good leadership, MWMA shall maintain a Board of Trustees, an Executive Committee and a CBO Council, democratically elected, working in an open, transparent, accountable, consultative manner, in accordance with a Constitution and an Administration and Finance Manual. Sharing of information (i.e. through minutes and Newsletters) to all members is a vital element in this process. Council members shall have authority to represent all member villages at village, local and central government level, and to solve conflicts. The Trustees and Patron shall hold the Society in trust and shall address any external conflict that is beyond the capacity of the Executive. All these elements are in place as will be outlined in the Constitution, but the persons in post will need capacity building and the tools needed for management. These tools include:

- Administration and Finance Manual (to be prepared)
- Staff service rules (included in the above)
- Procedures for tender and joint venture agreements (as per WMA regulation 2012 (needed)
- MWMA Strategic Plan (urgently needed)
- WMA Resource management Zone Plan RMZP (in progress).
- WMA by Laws, Rules and Regulations (have been prepared as part of LUP process but this is urgently needed for Ng'abolo)
- WMA Business Plan including financing and capital investments (Urgently needed).
- MWMA Code of Conduct (integrated in MWMA Constitution).
- Annual Work Plans and Budgets with quarterly and monthly detailed break downs.
- Physical and Financial Progress Reports.
- MWMA Newsletter.

5.2 Protection of WMA resources

The RMZP sets out to develop MWMA as a tourist destination and as such shall engage the MWMA in anti-poaching and law enforcement to protect their cultural heritage and economic opportunities for growth (ie. the WMA shall be seen as a community business).

The wildlife is the lifeline of the WMA business, and MWMA needs to ensure that all threats are dealt with including formulation of an integrated Wildlife Management &

Anti-Poaching; establishment of firebreaks on the perimeter and throughout the WMA and preparation of a fire hazard management strategy; avoidance of conflict with pastoralists and to accommodate their needs in times of drought for strategic grazing as need may arise; and develop problem animal control strategy to deal with animal/human conflict, especially where crop or livestock raiding is an issue, and to stop pastoralist from putting down poison for predators.

5.3 Leaning from other WMA pilot areas

To date, MWMA has to a large degree been single handed, pioneering the WMA concept for itself, learning from experience and from mistakes. In the future, MWMA should make efforts to liaise with the other 15 pilot WMAs, to encourage exchange programs, visits, meetings, sharing of information and lessons learnt so that best practises can be adopted and adapted in a consolidated fashion, deriving synergy from networking. A common strategy is needed as to how WMAs shall link up, how the AA Consortium and presence on the Block Allocation Committee (Regulation 55) shall come about.

5.3.1 NGO Partnership

The MWMA proposes to establish partnerships with development partners or likeminded institutions that shall build up the capacity of the CBO, to operate as an independent Authorised Association. NGOs shall also be a social service agent for its members and service provider for services like improve agriculture, ALS, IGAs, HIV/AIDS, education, gender, micro-enterprise, marketing, tree planting, awareness, and as a future patron, who could attract donor projects to continue working with the WMA.

5.3.2 IGA/ALS and Micro-enterprise Development

It will be the role of MWMA to cater for member village needs, to establish and scale up income generating activities (IGAs) and small-scale industries. To develop market outlets for members to engage in wildlife and other products that can improve livelihoods and food security, contributing to poverty reduction. Projects that can be considered include improved agricultural production and value added products; crafts, handicrafts, carvings, weaving; small livestock rearing, including poultry; trade in Phytotrade commodities, like baobab pulp, confectionery, cosmetic and oil seeds, Beekeeping; in addition, collection of thatch, firewood, medicinal plants, and mushrooms on a sustainable basis for home consumption.

5.3.3 Business Partnerships

As per User Rights (Tenth Schedule), for small-scale operations, MWMA has opted to develop these as IGAs in the village. However, for larger scale investments, the MWMA has opted to focus on a few, larger, but manageable revenue centres such as photo-tourism, safari hunting, camping and walking safaris. The area shall be rented out on a simple concession fee basis to allow for the limited capacity of the WMA to manage complex business arrangements. All contracts will be in accordance with the RMZP and laid down procedure as in WMA Regulations 2012.

5.3.4 Infrastructure and communication development

The District Council needs to develop current seasonal routes to reliable-all-weather roads to ensure accessibility of the MWMA. Communication towers are being installed to ensure telecommunication network so are to be able to control poaching and guarantee security of visitors.

5.3.5 MWMA Monitor Business Plan Implementation

The MWMA Executive shall meet regularly with investor partners, to jointly monitor and manage these concessions in accordance with investment agreements as in Twelfth Schedule of WMA regulations, and to see that the Business Plan is being followed.

5.3.6 Technical Assistance

MWMA as an institution and as a business operation, is still very much in its infancy. As such it will need time to grow, to develop capacity, until it reaches a point of autonomy, able to self-govern and develop business acumen. Such support generally comes through a project, which is most likely donor supported, and is considered part of capital investment to cover costs of all project activities. In this case, MWMA will need assistance for the following phases until such time as the Business Plan makes sufficient revenue for run itself.

5.4 Proposed studies

MWMA needs to continue to not only monitor progress against the RMZP, but also to initiate a number of studies that will allow a better, fine tuning of the Business Plan. This can include involving university students from the MWMA community to help with studies (preferably if they contribute to higher degrees).

5.4.1 Game Census

Routine game census along pre-set transects to monitor changes in game numbers so as to adjust the hunting packages (Annex 12). This would also include records of annual off-takes against quotas to assess if the quota setting is too high.

5.4.2 Forest Resource Studies

- Studies on the hardwood capacity of the forest to determine if the rate of off-take is sustainable.
- Studies on the fuelwood capacity to assess if the off-take rates are sustainable and viable.

6 WMA MANAGEMENT ZONING

During village land use development process, all members of Makame WMA suggested that their WMA area be subdivided into three specific management zones which are **(a) hunting management subzone and (b) Photographic safaris subzone and (c) carbon project management subzones**. The proposed zoning scheme is the future basis for determining what can and cannot take place in the different habitats, and resources of the WMA. The Management Zone Plan, is the "heart" of the joint venture management strategy. It is were proposed activities can sustain or destroy the environment. The activities listed by zone are strategically proposed so as to ensure that viability if the WMA is ensured, and that peripheral activities are in conformity, and do not aggravate the core area. The zoning scheme has been drawn up based on the listed exceptional resources, the management schemes, and identified key planning issues and concerns.

6.1.1 Hunting management subzone (*Eng'orore*). The hunting subzone have three hunting blocks which comprise Talamai, Maasai East and Irkiushi-oibor (Map 2).

Rationale for the zoning	Hunting is the most viable wildlife management option in the area. In order to ensure that Makame WMA receives adequate income to run all the operations and fund local development projects hunting needs be developed and promoted.				
Resources and value	Land, Elephants, Buffalo, Lion, and Leopard. Mountains, natural dams, and forest, birdlife, ritual sites, traditional meat camps, and historical sites.				
Description of WMA huting management subzone.	Irkiushiobor	Ndedo	Makeme	Katikati	Ngabolo Village
	• Lootroboo • Loisolo • Irpararuni • Ndaja • Mbokui	• Loosenya • Ngoisuki • Oloyapasei • Oldonyo Kalakala • Iloikishaani • Olturoto Onyokie • Kamagere • Lamakau • Soito Naarok • Oloronyo • Inging'ori	• Endonyo Narok • Olotudung'o Leisanga • Naaruko • Naibormut • Idonyo alala • Sale	• Long'iding'idata • Nasinyai • Irendi • Gou • Ichroi oorok • Laangai	• Oldonyo wuas • Embarbal • Kimutul • Orkiu • Eldepe • Loikishar • Lajang`ak • Engungumwa • Karatin • Lesoit • Lalaimurung`ai • Ngurai
Allowed Uses	***Uses***			***Limits of Acceptable Use***	
	Professional hunting Photographic safaris Education and training visits Game viewing Walking safaris Bee keeping Season livestock grazing Ritual practices Collection of medicinal plants Game viewing Nature trailing and walking safaris Camp sites Season livestock grazing.			Hunting activities operating from 31st December to 1st July, annually. Livestock season grazing from 1st January to June 30th annually.	

Prohibited Uses	Wildfires Agriculture Livestock permanent settlement
Other Conditions	• All conditions imposed by laws and regulations of the country including village by laws

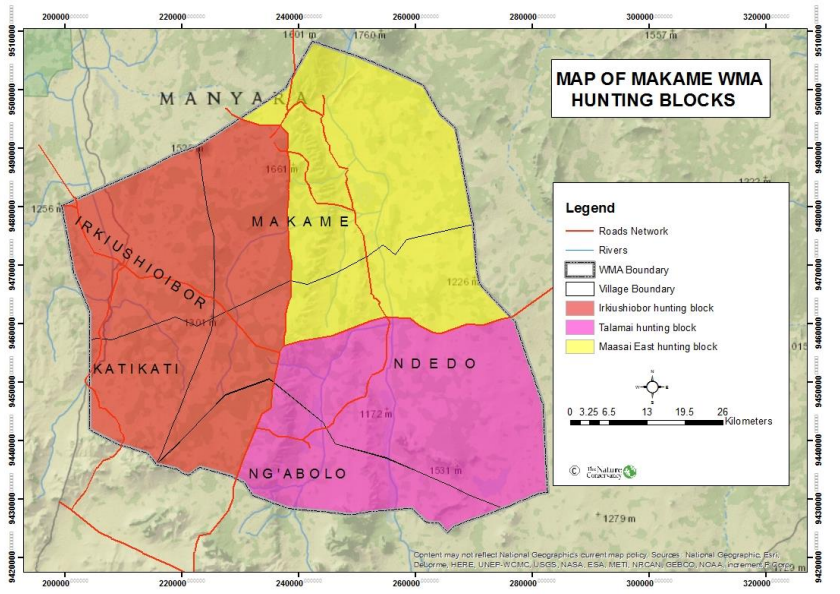
6.1.1.1 Descriptions of the hunting blocks

Talamai hunting block: Talamai blocks is 148,347 hectares in size and spans two villages (ndedo and Ng'abolo) and its boundary is marked by the road from Kibaya to Orkesument via Ndedo Village (Map 2).

Maasai East hunting block: Maasai East block is 140,265 hectares and its boundary is marked by the old road to Narakauo Village, all the way around the WMA boundary clockwise to the road from Orkesumet - Kibaya and back to where the Narakauo and Kibay - Orkesumet roads meet (Map 2).

Irkiushi-oibor hunting block: Irkiushi-oibor block is to the west of Kibaya – Narakauo road. It is 178,452 hectares in size and covers Katikati and Irkiushi-oibor villages and bit of western part of Makame Village (Map 2).

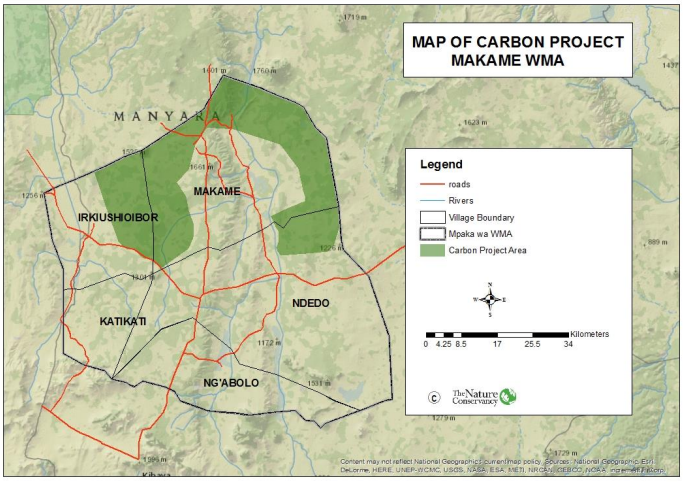
MAP 2: Makame WMA Hunting Blocks



6.1.2 Carbon project management subzone. The area set aside for carbon project is 111,094 hectares. Over 90% of the area concentrated in Makame village (Map 3).

<table>
<tr><td>Rationale for the zoning</td><td colspan="3">Carbon harvest preserves forests, bush and grasslands while maintaining carbon sinks to the already rising levels of atmospheric carbons and hence helps to balance threatening global climate changes.</td></tr>
<tr><td>Resources and value</td><td colspan="3">Natural forests, bush and grasslands. Wildlife animals including elephants, buffalo, lions, and leopard. Mountains, natural dams, birdlife, ritual sites, traditional meat camps, and historical sites.</td></tr>
<tr><td>Description of Manyiho Boundaries</td><td>Irkiushiobor
• Armame
• Olturoto lesoit
• Elang’ata oondirashin
• Lendundulu
• Indonyo oolowarak</td><td>Ndedo
• Engeju osiaiti
• Engung’u olowaru
• Engusero ooltepes
• Bwawa lelukunya
• Longing’ori</td><td>Makeme
• Indonyo oolowarak
• Engurashi
• Olboloti
• Engutoto
• Ingoitokosho
• Ingoropili
• Ndonyo naisunguro
• Olmokolokolo
• Engeju osiaiti
• Engug’u olowaru</td></tr>
<tr><td rowspan="11">Allowed Uses</td><td colspan="2">Uses</td><td>Limits of Acceptable Use</td></tr>
<tr><td colspan="2">Seasonal livestock grazing</td><td rowspan="10">Livestock grazing activities need to operate from 1st January to 30th June, annually.</td></tr>
<tr><td colspan="2">Photographic safaris</td></tr>
<tr><td colspan="2">Temporary settlements</td></tr>
<tr><td colspan="2">Game viewing</td></tr>
<tr><td colspan="2">Grass cutting for thatching</td></tr>
<tr><td colspan="2">Beekeeping</td></tr>
<tr><td colspan="2">Education and training visits</td></tr>
<tr><td colspan="2">Professional Hunting</td></tr>
<tr><td colspan="2">Carbon project</td></tr>
<tr><td colspan="2">Camp sites</td></tr>
<tr><td>Prohibited Uses</td><td colspan="3">Wildfires
Agriculture
Charcoal burning
Permanent settlement
Uncontrolled seasonal livestock grazing</td></tr>
<tr><td>Other Conditions</td><td colspan="3">• All conditions imposed by laws and regulations of the country including village by laws</td></tr>
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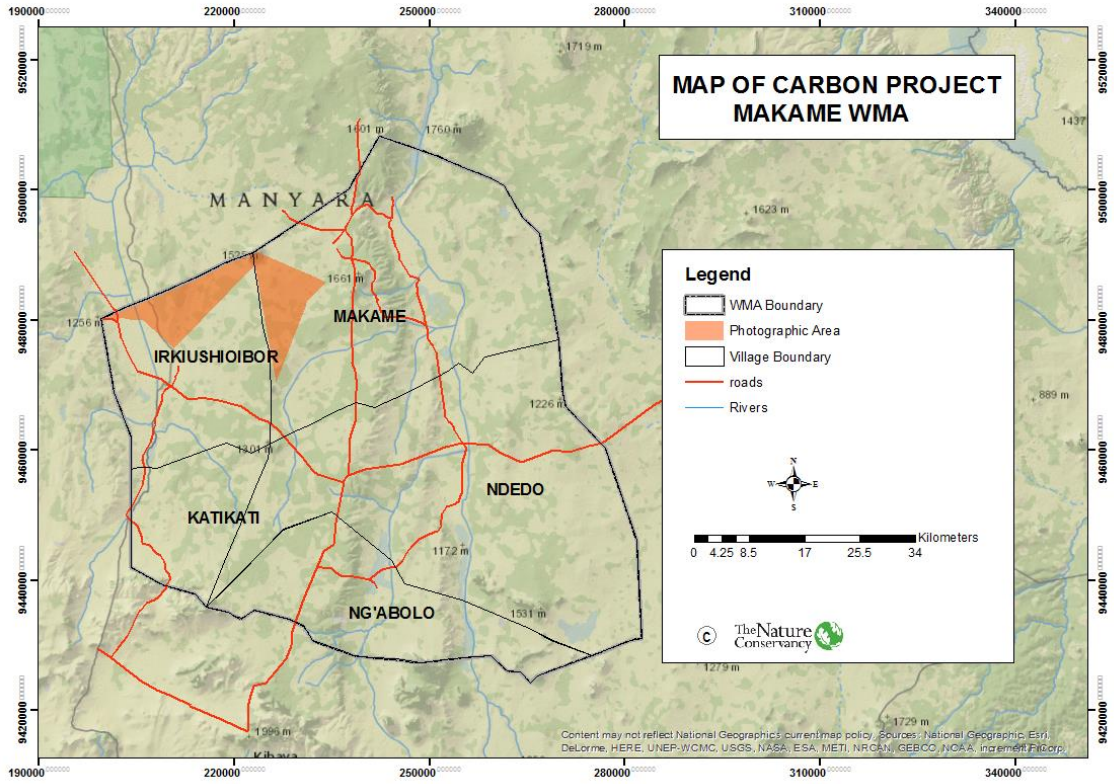
MAP 3: Makame WMA Carbon Project zone



6.1.3 Photographic management subzone. The area set aside for photographic activities is carbon project is 20,878 hectares. All the area is concentrated in Makame and irkiushi-oibor villages (Map 4).

Rationale for the zoning	Photographic activity is also a very viable wildlife management option in the area. In order to ensure that Makame WMA receives adequate income to run all the operations and fund local development projects photographic safaris needs be developed and promoted.	
Resources and value	Land, Elephants, Buffalo, Lion, and Leopard. Mountains, natural dams, and forest, birdlife, ritual sites, traditional meat camps, and historical sites.	
Description of WMA huting management subzone.	Irkiushiobor • Loondorobo • Engusero oo ndirashin • Engusero oo ingati • Kirwa	Makeme • Loondorobo • Irkodin • Naisung'uro • Ewas oo Njarurukin • Ngoitikoshi
Allowed Uses	***Uses***	***Limits of Acceptable Use***
	Professional hunting	Hunting activities operating from 31st December to 1st July, annually. Livestock season grazing from 1st January to June 30th annually.
	Photographic safaris	
	Education and training visits	
	Game viewing	
	Walking safaris	
	Bee keeping	
	Season livestock grazing	
	Ritual practices	
	Collection of medicinal plants	
	Game viewing	
	Nature trailing and walking safaris	
	Camp sites	
	Season livestock grazing.	
Prohibited Uses	Wildfires Agriculture Livestock permanent settlement	
Other Conditions	• All conditions imposed by laws and regulations of the country including village by laws	

Map 4: Makame WMA Photographic Safaris zone



4. WMA MANAGEMENT PROGRAMS

This chapter describes specific management programs, principles, objectives and actions to be undertaken to achieve objectives of the RMZP and implement the management zone scheme. The activities proposed in this RMZP do not repeat description of management zone scheme but reinforces it by defining specific and practical actions that would help to minimise identified problems, protect outstanding resources and values, and help achieve protected area purposes.

The detailed description of the management programs assist on-site MWMA managers in better understanding of what the RMZP demands from them over a period of five years. Also detailed description of the program normally helps ease development and implementation of AOPB. AOPB shall contain detailed annual activities and financial plans or budgets. However detailed description of activities, in terms of how and when each activity shall be implemented, will be considered during the development and implementation of a General Management Plan (GMP).

6.1.3 *Visitor use, development and revenue program (VUDRP)*

The overall aim of this program is to enhance visitor enjoyment and satisfaction and generate revenue that would sustainable funding for MWMA through non-consumptive and consumptive tourism, through rational use and allocation of revenue generated from the area and through sustained support from stakeholders. In the next five years the MWMA shall implement VUDRP while adhering to four principles encompassing (i) integration of tourism into sustainable development programs, (ii) development and management of sustainable tourism, (iii) participatory tourism and, (iv) sustainable tourism business.

Summary program objectives, targets and activities

Objective 1: To increase and sustain financial contribution of the MWMA to the village governments by 400% by 2022	
Target 1.1 Income from ecotourism, including hunting, stand at Tshs 200,000,000 per annum by 2022	Activity 1.1.1 Develop a framework for tourism concessions and contracts
	Activity 1.1.2 Develop and implement ecotourism entrepreneurial plan
	Activity 1.1.3 Recruit and train project and ecotourism manager to operate VUDRP
	Activity 1.1.4 Introduce ecotourism opportunities based on the management zone scheme
	Activity 1.1.5 Develop and implement marketing plan
Target 1.2 Income from non-ecotourism sources stand at Tshs 50,000,000 per annum by 2022	Activity 1.2.1 Design and implement conservation projects and funding projects for MWMA
	Activity 1.2.2 Recruit and train project and ecotourism manager to implement conservation projects
	Activity 1.2.3 Develop and implement financial monitoring and evaluation plan
	Activity 1.2.4 Develop and implement financial regulation and procedures manual
Objective 2: To help tourists achieve highest possible degree of satisfaction by 2022	
Target 2.1 Tourist feedback framework developed by June 2019	Activity 2.1.1 Develop tourism satisfaction indicators
	Activity 2.1.2 Develop and implement visitor satisfaction monitoring plan

	Activity 2.1.3 Develop and implement procedures for reviewing and improving tourist programs
Objective 3: To ensure that ecotourism developments, including hunting, are designed, appraised, monitored and evaluated for sustainability by 2022	
Target 3.1 Environmental impact management mechanisms developed/adopted by June 2018	Activity 3.1.1 Review and implement village land use plans
	Activity 3.1.2 Develop database on impact of land uses inside the WMA
	Activity 3.1.3 Undertake training on EIA

6.1.4 Administration and Operations Program (AOP)

The purpose of this program is to boost efficiency and effectiveness of the MWMA operations through the provision of relevant facilities, infrastructure and training to MWMA staff and management. Also the programs shall implement activities that coordinate the implementation of the RMZP. The programme will observe four main cores which, include Administration and WMA operations; professional guidance on the management of WMA; adaptive and planned management and collaboration; and use of local and external resources for synergy.

Summary of program objectives, targets and activities

Objective 1: To ensure that operations of the WMA are efficient and effective by 2022	
Target 1.1 Human resources management framework in place by June 2018	Activity 1.1.1 Develop and operationally organisation structure to administer the WMA
	Activity 1.1.2 Develop and implement comprehensive Schemes of Services for staff working with the WMA
	Activity 1.1.3 Develop and implement a comprehensive Human Resource Development plan
	Activity 1.1.4 Develop and implement staff performance evaluation
	Activity 1.1.5 Recruit and deploy appropriate staff
	Activity 1.1.6 Develop and implement Human Resources Policy and Procedures
	Activity 1.1.6 Develop HIV/AIDS Operational Procedures and Action Plan.
Target 1.2 Anti-poaching management framework developed by June 2018	Activity 1.2.1 Identify law enforcement staff and material resources need
	Activity 1.2.2 Recruit Community Scouts based on Scheme of Service
	Activity 1.2.3 Develop and implement scout training plan
	Activity 1.2.4 Develop and implement Memorandum of Understanding (MoU) to establish law enforcement network with adjacent authorities
	Activity 1.2.5 Provide law enforcement equipment and facilities
	Activity 1.2.6 Develop and implement anti-poaching schedule
Objective 2: To ensure that facilities and infrastructure for WMA operations exist and properly maintained by 2022	
Target 2.1 Facility and infrastructure management framework developed by June 2019	Activity 2.1.1 Develop facility replacement and infrastructure management policy and procedures
	Activity 2.1.2 Develop and implement facility and infrastructure maintenance budget and schedules
	Activity 2.1.3 Construct water dams
Target 2.2 Adequate administration facility	Activity 2.2.1 Develop a list and prepare a budget of equipment required for efficient WMA administration and operations

acquired by June 2018	Activity 2.2.2 Develop and submit a funding proposal to secure the needed equipment
Target 2.3 Relevant infrastructure in place and maintained by June 2019	Activity 2.2.1 Develop a list and prepare a budget of infrastructure required for efficient and effective WMA administration and operations
	Activity 2.2.2 Develop and submit a funding proposal to secure and maintained required infrastructure
	Activity 2.2.3 Mark WMA boundaries, including zones
Objective 3: Ensure that RZMP is approved and AOPB is developed and fully implemented annually by September 2017	
Target 3.1 AOPB framework developed by December 2018	Activity 3.1.1 Tables the draft RMZP to the Director of Wildlife for endorsement
	Activity 3.1.2 Develop AOPB format
	Activity 3.1.3 Develop and implement Annual Operation Plan and Budget to implement the RMZP
	Activity 3.1.4 Form and operationalise RMZP implementation team
	Activity 3.1.5 Develop and implement a monitoring
	Activity 3.1.6 Acquire Registration documents of Ng'abolo Village
	Activity 3.1.8 Develop General Management Plan

6.1.5 Wildlife-people relations program (WPRP)

The program aims at supporting community livelihoods in order to ensure that the relationships between people and wildlife are improved and maintained. Enhanced relationship would guarantee sustained wildlife conservation support from the local people in the three villages. Also good neighbourhood would ensure that indigenous knowledge is mainstreamed into sustainable management of the WMA. In that regard, the WPRP program will be guided by the following principles: - local people relation, integration of traditional structures in the management of the WMA, preservation of WMA ecology, recognition of existing uses and seeking solution for people-wildlife conflicts.

Summary of program objectives, targets and activities

Objective 1: Conflicts between people and wildlife reduced by 50% by 2022	
Target 1.1: Conflicts resolution framework developed by June 2018	Activity 1.1.1 Develop wildlife-community conflicts profile
	Activity 1.1.2 Establish and operationalise Makame stakeholder forum
	Activity 1.1.3 Review and implement land use plans
	Activity 1.1.4 Develop and implement conflict management plan and conflict monitoring plan
	Activity 1.1.5 Develop and implement policy, procedures, guidelines and bye laws on human settlements and movement of people and livestock in the area
	Activity 1.1.6 Provide voter education to ensure election of best leaders to resolve conflicts
	Activity 1.1.6
Target 1.2: Property damage by wildlife minimized by June 2021	Activity 1.2.1 Develop profile on damage caused by wildlife on local community
	Activity 1.2.2 Review and implement land use plans
	Activity 1.2.3 Develop local policy and operational procedures on minimizing damage and impacts caused by wildlife on people's properties

	Activity 1.2.4 Establish mechanisms to minimize property damage by wildlife
	Activity 1.2.5 Monitor incidences of wildlife damages to local people profile
	Activity 1.2.6
Target 1.3: Livestock-wildlife disease incidences reduced by 30% by June 2022	Activity 1.3.1 Develop profile on livestock-wildlife diseases incidences in the area
	Activity 1.3.2 Review and implement land use plans
	Activity 1.3.3 Develop and operationalise a local policy, procedures and guidelines on livestock keeping
	Activity 1.3.4 Monitor livestock-wildlife disease incidences
Objective 2: Attitudes of local people towards wildlife improved by June 2022	
Target 2.1: 75% of the local population is willing to support conservation by June 2022	Activity 2.1.1 Study and develop profile on local people attitudes towards wildlife
	Activity 2.1.2 Review and implement land use plans
	Activity 2.1.3 Develop and implement ways of improving local people attitudes towards wildlife
	Activity 2.1.4 Monitor attitudes of local people towards wildlife
Objective 3: Local people incomes increase by 20% and social conditions improved by June 2022	
Target 3.1 Income of each resident stand at US$ 1 a day by June 2022	Activity 3.1.1 Study and develop income profile of local people in the five villages
	Activity 3.1.2 Develop and implement natural resources utilisation policy, procedures, guidelines and bye laws
	Activity 3.1.3 Establish and operationalise Community Conservation and Development Bank (SACCOS,VICOBA)
	Activity 3.1.4 Provide training on wildlife entrepreneurial skills and project planning
	Activity 3.1.5 Monitor incomes of local people
Target 3.2: Social conditions of the local people reach UNDP standards by June 2022	Activity 3.2.1 Study and develop social condition profile of the local people
	Activity 3.2.2 Develop and implement health improvement and HIV/AIDS strategy
	Activity 3.2.3 Monitor health conditions of local people
	Activity 3.2.4 Support primary, secondary and tertiary education and training programs
	Activity 3.2.5 Improve agriculture for sustainable conservation
Objective 4: Indigenous knowledge and traditional systems integrated into planning and management of WMA by June 2022	
Target 4.1 Framework for integrating local knowledge in WMA management process in place and operational by June 2018	Activity 4.1.1 Establish and operationalise indigenous knowledge local policy, procedures and guidelines
	Activity 4.1.2 Monitor use of relevant local knowledge in the WMA management process
	Activity 4.1.3 Study and document local knowledge relevant to WMA management process

6.1.6 Natural resources management program (NRMP)

The purpose of Natural resource management program is to protect biodiversity and the Handeni-Kiteto-Simanjiro-Tarangire ecosystem for sustainable livelihoods. Furthermore, the program aims at ensuring that natural resource data is available for rational decisions on management of WMA. The AA shall ensure that there is sustainable harvest and constant stock by increasing renewable resources to cover for

loss on non-renewable resources. Precaution should be observed to safeguard ecological functions in the face of uncertainty. Also, the AA would encourage use of natural resources in ways that ensure non-declining stream of benefits for all, and without weakening ecological functions of the resources.

Summary of program objectives, targets and activities

Objective 1: Wildfire reduced to an ecologically acceptable level by June 2022	
Target 1.1: Incidences of wildfire reduced by 100% by June 2022	Activity 1.1.1 Study and develop wildfire profile
	Activity 1.1.2 Develop and implement Fire Technical Detailed Management Plan
	Activity 1.1.3 Develop and operationalise policy, procedures, guidelines and bye laws on the use and management of fire in the area
	Activity 1.1.4 Monitor incidences and extent of wildfire
	Activity 1.1.5 Establish wildfire database
Objective 2: Wildlife populations maintained at ecologically acceptable levels by June 2022	
Target 2.1: Wildlife-livestock disease incidences reduced by 50% by June 2019	Activity 2.1.1 Study and develop wildlife-livestock disease incidence profile in the area
	Activity 2.1.2 Review and implement land use plans
	Activity 2.1.3 Develop and implement technical detailed disease management plan
	Activity 2.1.4 Monitor disease incidences in the area
	Activity 2.1.5 Establish disease database
Target 2.2: Wildlife habitat management framework established by June 2019	Activity 2.2.1 Study and develop wildlife-livestock habitat profile
	Activity 2.2.2 Develop and implement wildlife-livestock habitat technical detailed management plan
	Activity 2.2.3 Monitor habitat condition and use by wildlife and livestock
	Activity 2.2.4 Develop habitat condition and use database
	Activity 2.2.5 Improve wildlife-livestock habitat including water availability for wildlife and livestock
Target 2.3 Wildlife monitoring framework in place by June 2018	Activity 2.3.1 Study and develop wildlife species profile
	Activity 2.3.2 Undertake annual counts of numbers of key wildlife species
	Activity 2.3.3 Develop wildlife database
	Activity 2.3.4 Monitor wildlife populations
	Activity 2.3.5 Use census data to determine annual wildlife utilisation quotas
Target 2.4 Illegal harvest controlled by June 2018	Activity 2.4.1 Study and develop profile on illegal harvest of natural resources in the area
	Activity 2.4.2 Develop mechanisms for sustainable utilisation of wildlife resources
	Activity 2.4.3 Develop mechanisms to combat illegal harvest of wildlife resources
	Activity 2.4.4 Develop policy, procedures, guidelines and bye laws on wildlife resource utilisation
	Activity 2.4.5 Develop and operationalise database on illegal harvest of wildlife resources
Target 2.5 Wildlife database established by June 2018	Activity 2.5.1 Develop database format (manual database)
	Activity 2.5.2 Train local people on the management of manual database
	Activity 2.5.3 Purchase necessary equipment and operationalise natural resources database

7 ENVIRONMENTAL IMPACT ASSESSMENT

7.1 Impacts of Activity

In line with the EIA Guidelines (1998), the proposal has adopted WD mechanisms of ranking activities in the RMZP that have significant impacts as a high 2-3 ranking, +ve or –ve, and has attached mitigation measures to each as part of the environmental management plan (EMP), and require regular monitoring. Lower numbers, are considered as not having any immediate environmental threats. A site specific and more detailed EIA will have to be carried out for any construction work, like the lodges. Based on the perceived impacts of the activities, Annex 15, summarizes the likely impacts of the RMZP actions, and proposes mitigation recourse.

7.2 Socio-economic and Cultural Values of Activity

The whole principle behind the WMA is to generate revenue for the stakeholders, the members of MWMA for SE upliftment through community development projects. The activity as such should contribute greatly to development in the area.

The establishment of MWMA, and the conservation of its core, shall serve as a valuable demonstration of the preservation of a national heritage, adding to the already important cultural values placed on wildlife. Future generations of MWMA shall have a different perspective on wildlife and its value to them.

7.3 Management Objectives and Resource Protection

Fundamentally, the underlying principles of the management objectives, are imbedded in the need for resource protection and sustainable management. MWMA therefore sees resource protection as a key, management strategy, the obligation of all its members. There is in place an anti-poaching team of 10 game scouts and a team of 48 Village game Scouts, answerable to the VDC and VNRMC, patrolling and regulating resource use is as per permit, as per RMZP, and in line with sustainable off-take rates.

Any resource used such as tourist hunting, hardwood logging, fuelwood sales, shall be closely monitored and documented against approved RMZP off-takes.

8 IMPLEMENTATION OF THE RMZP

8.1 RMZP Implementation Requirements

There are a number of players in the implementation of the RMZP. Detailed roles, TORs and responsibility is highlighted in Annex 8, as refers to the Society, and in Annex 9, as the Society interaction with the outside world.

8.1.1 The Relationship of the MWMA and the Public:

The District Council: In accordance with WMA Regulation 2012, the CBO shall work with the District Council to facilitate the application of the CBO to become an AA and to establish a WMA, linking the AA and Director of Wildlife on issues specific to the WMA Regulations. This shall include approving village NR by laws, Village LUPs, monitor enforcement of laws, conduct of problem animal control and issue resident hunting licenses to members. The WMA should be a fixed item on the district developmental agenda. More details are provided in Annex 9.

The District Natural Resources Advisory Body (DNRAB): In accordance with WMA Regulation 2012, the AA shall be a member of the DNRAB as the forum for arbitration and resolution of conflicts, to co-ordinate technical and legal advice, set quota and oversee and administer cross-sectoral issues. More detailed terms of reference appear in Annex 9.

The Village Council: In accordance with WMA Regulation 2012, the Village Council shall provide the land for designation of a WMA, co-ordinate natural resource activities, prepare Land Use Plans and by laws. Approve benefit sharing mechanism, monitor the AA, ensuring implementation of sector policies. The WMA should be a fixed item on the village developmental agenda. More details are provided in Annex 9.

The Village Game Scout (VGS): In accordance with WMA Regulation 2012, the VGS shall be appointed by the AA, through the Village Council, to work with the Village Council. To conduct patrols in the WMA and within village boundaries, control problem animals and monitor utilisation of natural resources, guard against encroachment and apprehend persons who contravene the WMA Regulations, manage wildfires and carry out anti-poaching operations, reporting to Village Council and WMA management.

Non-Governmental Organisations (NGO): The AA may enter into agreement with any NGO, donor, and project of similar institution for the purposes of financial, technical, research and development support but WMA Regulation 2012, demands the Director of Wildlife to seek approval from the Minister. CBO Council shall approve a separate agreement with each partner indicating type of support, roles and obligations of each party, phases and exit strategy.

8.1.2 The Internal Functions of the Society

The Society, when it achieves Authorized Association status, shall perform the following functions and activities as laid out in WMA Regulation 2012 in line with the RMZP:

a. Negotiate, acquire, monitor, manage and enforce User Rights in the WMA (in accordance with the Tenth Schedule of WMA Regulations), and ensure regular updates through the Director of Wildlife.
b. Enter into agreements with the Village Councils on management of the WMA, setting up and operating the CBO Council as per Constitution.
c. Prepare and manage the WMA in accordance with the Land-Use Plan (LUP)(Sixth Schedule) consolidated into the Community Development Plan, Resource management Zone Plan (RMZP)(Seventh Schedule) Business Plan, and WMA Regulations, reviewing the RMZP from time to time.
d. Co-operate with the Director of Wildlife, and submit reports as required.
e. Recruit and train Village Game Scouts (VGS) in accordance with WMA Regulations (WMA Regulations 2012), and ensure anti-poaching activities protect the core from unsustainable use.
f. Lobby and support the making of, and enforcement of wildlife management By-Laws, rules and regulations for all villages concerned as per Annex 8.
g. Tender, appraise, negotiate and enter into contractual agreement(s) regarding commercial utilization of resources and investments in the WMA (in accordance with the Twelfth Schedule of WMA Regulations) as per Business Plan, and establish a Joint Venture Management Committee as prescribed in WMA Regulation 2012.
h. Develop and implement mechanisms for equitable sharing of costs and benefits between the AA and member villages for projects and per Community Development Plan, as per Trust Fund and Endowment scheme.
i. Seek authorization from and report to the Village Assembly, and oversee investment and development activities as per approved Business Plan and Community Development Plan.
j. Engage competent experts to assist the AA, subject to Director of Wildlife approval.
k. Protect biodiversity resources.
l. Support control of problem animals.
m. Keep government trophies in safe custody.
n. Manage finances according to laid down procedure and Administration and Finance Manual.
o. Prepare work plans and budgets, maintain proper records, and provide quarterly, semi-annual and annual progress reports to the CBO Council and Village Assembly meetings.
p. Issue permits for members and Joint Venture partners utilizing resources in a WMA.
q. Collect and remit fees to relevant authorities, obtaining receipts.
r. Recruit and train AA staff to man the Secretariat as per agreed MWMA Staff Terms and Conditions.
s. Liaise with other institutions for information and technology exchange, especially other WMAs for experience sharing.
t. Acquiring and disposing of the Society's property, assets and investments, and dealing with any conflict, through the Board of Trustees.

u. Undertake resource monitoring (in accordance with Ninth Schedule of the WMA Regulations).
v. Propose quota to the District Natural Resources Advisory Body (DNRAB).

8.1.3 Evaluation and Reviews

Anticipated is that MWMA shall apply for donor support for the period July 2006 to June 2010. During this period, annual reviews shall be held with the donor and the technical assistance. In addition, during the mid-term of this project support (ie. end of 2008), an independent evaluation shall be called for by an external consultant to the project. The object of this evaluation shall be to take stock of the performance, not only of the project, but also of the progress against the RMZP. The RMZP shall be revised according to the outcome of this study.

8.1.4 Monitoring & Evaluation of Activities

The MWMA Board of Trustees, shall be the overall, oversight body, monitoring the assets of the MWMA, and acting on its behalf to resolve conflict.

The MWMA Executive shall be the day to day management, monitoring progress against agreed work plans, budgets and strategies, to ensure conformity to the RMZP. To do this, they should meet 4 times/year to take stock of progress.

The MWMA Council Representatives are the liaison between the Executive and the communities, expected to hold VDC and VNRC meetings to report back. They shall be the grassroots monitoring that communities conform to by laws and implement plans as agreed.

As part of the donor Project, a Project Steering Committee (PSC) shall be set-up, with representation from the MWMA, donor and technical assistance. This PSC shall be the policy making body of the Project component of the RMZP.

M&E is also undertaken in a cooperation with the District Game Officers who through the Joint District Natural Resource Advisory Board should make available the proper forms for official external evaluation of WMA performance and use the feedback as background for the oversight provide by the Board. MWMA shall adapt collection of monitoring data to the forms provided.

8.1.5 Financial Management

An AA shall be:
a. Responsible for financial management form the different forms of resource use.
b. Each year, the AA, in consultation with the JDNRAB, shall prepare an annual budget and action plan in the format in the Thirteenth Schedule in accordance with WMA Regulations 2012. These budgets shall be submitted to each Village Council for endorsement by the Village Assembly.
c. The AA, shall establish procedures for disbursement of funds, payment of taxes, dues, etc, and submit accounts for annual audit by the Controller and Auditor General.

9 BIBLIOGRAPHY

Anon (2003) WMA: Legal Analysis. Report 16 pg.

Kiteto District Investiment Profile 2015

Katiba ya Jumuia ya Hifadhi ya Wanyamapori Makame: (2017) Katika Vijiji, Ndedo, Makame, Irkiushbour,Ngabolo na Katikati.

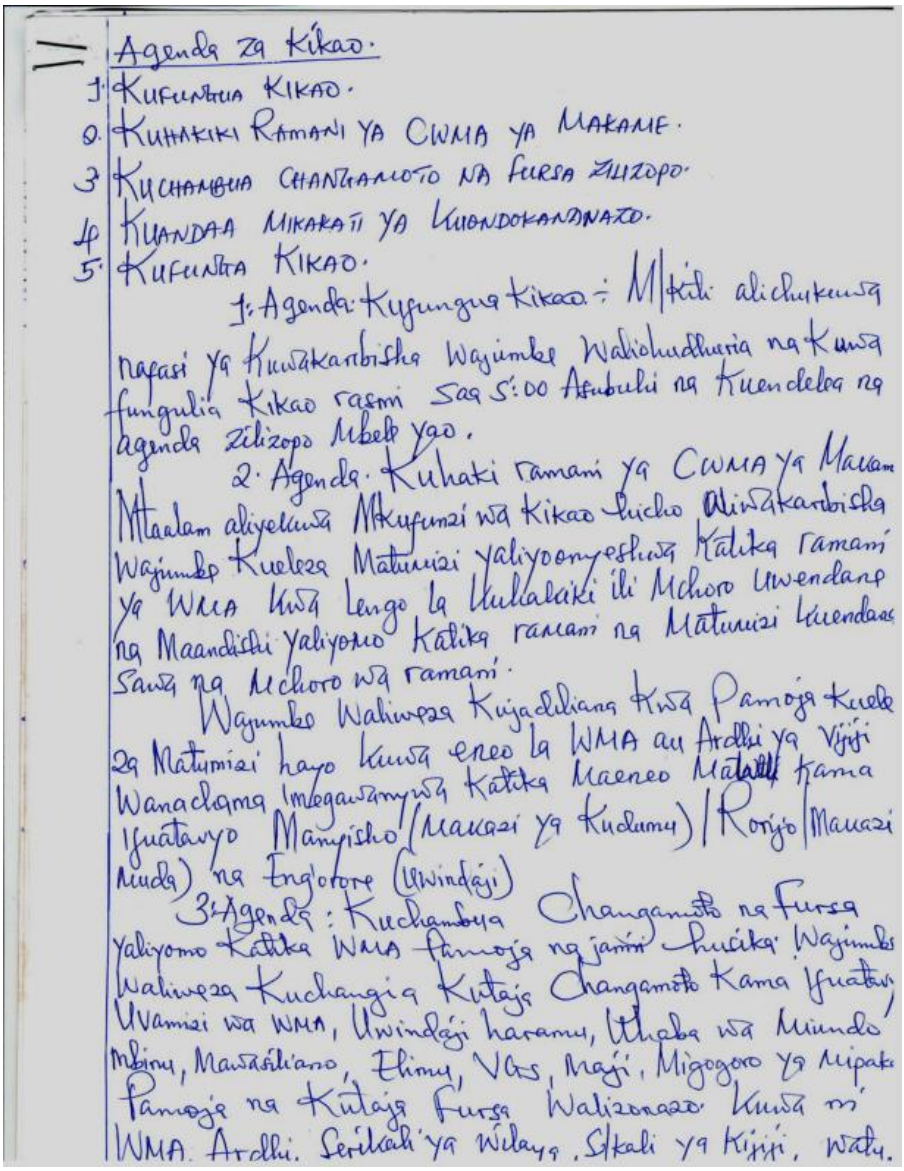
The Wildlife Conservation Act number5 of 2009.

The Wildlife Conservation (Wildlife Management Areas) Regulations, 2012.

The Wildlife conservation (Tourist hunting regulation), 2015.

The Resource Management Zone Plan of Makame WMA, Makame WMA.

Annex 3: Minutes and list of Participants Involved in Planning Process



Agenda za Kikao.

1. Kufunguwa Kikao.
2. Kuhakiki Ramani ya CWMA ya Makame.
3. Kuchambua Changamoto na fursa zilizopo.
4. Kuandaa Mikakati ya Kuondokanazo.
5. Kufunga Kikao.

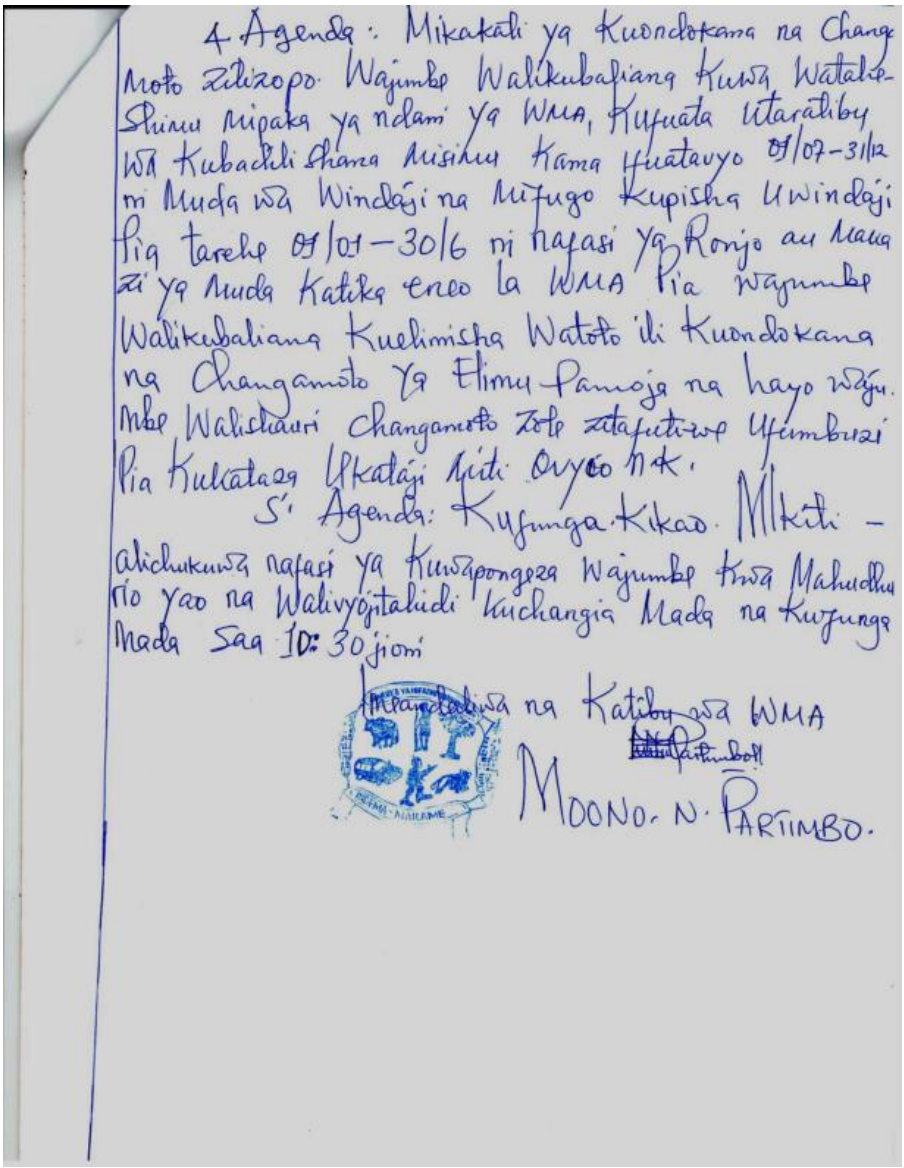
1. Agenda: Kufungua Kikao: Mkiti alichukuwa nafasi ya Kuwakaribisha Wajumbe Wakiohudhuria na kuwa fungulia Kikao rasmi Saa 5:00 Asubuhi na Kuendelea na agenda zilizopo Mbele yao.

2. Agenda. Kuhaki ramani ya CWMA ya Makam Mtaalam aliyekuwa Mkufunzi wa Kikao Kicho Alivokaribisha Wajumbe Kueleza Matumizi yaliyoonyeshwa Kaika ramani ya WMA kwa Lengo la Kulalaiki ili Mchoro Uwendane na Maandishi yaliyoko Kaika ramani na Matumizi Kuendana Sawa na Mchoro wa ramani.

Wajumbe Waliweza Kujadiliana Kwa Pamoja Kuele za Matumizi hayo kuwa eneo la WMA au Ardhi ya Vijiji Wanachama Imegawanywa Kaika Maeneo Matatu kama Ifuatavyo Mangisho (Makazi ya Kudumu) / Konjo / Mauzi Kuda) na Engorore (Uwindaji)

3. Agenda: Kuchambua Changamoto na fursa yaliyomo Kaika WMA Pamoja na jamii Kwika. Wajumbe Waliweza Kuchangia Kutaja Changamoto Kama Ifuatavyo Uvamizi wa WMA, Uwindaji haramu, Uhaba wa Maundo Mbinu, Mauaji wa Binadamu, Ethimu, VVU, Majì, Migogoro ya Mipaka Pamoja na Kutaja Fursa Walizonazo Kuwa ni WMA. Ardhi. Serikali ya Wilaya. Sikali ya Kijiji, Wafu.

The Resource Management Zone Plan of Makame WMA, Makame WMA.



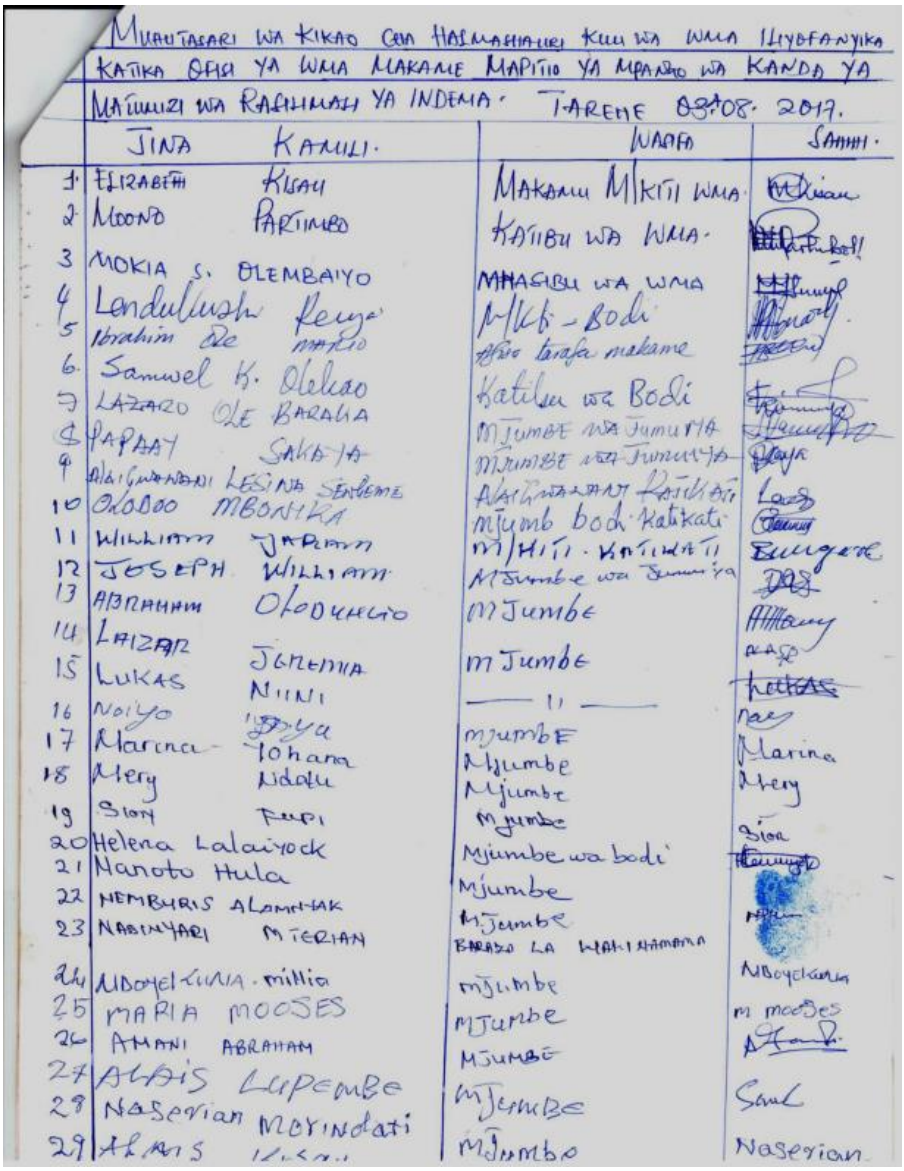
4. Agenda: Mikakati ya Kuondokana na Changamoto zilizopo. Wajumbe Walikubaliana Kuwa Watalipa Shilingi Mipaka ya ndani ya WMA, Kufuata Utaratibu wa Kubadili Shamba Misitu Kama Ilivyotayo 01/07-31/12 ni Muda wa Windaji na Mfugo Kupisha Uwindaji Pia tarehe 01/01-30/6 ni hafasi ya Ronjo au Mawazi ya Muda Katika eneo la WMA Pia Wajumbe Walikubaliana Kuelimisha Watoto ili Kuondokana na Changamoto ya Elimu Pamoja na hayo Wajumbe Walishauri Changamoto Zote zitafutiwe Ufumbuzi Pia Kukataza Ukataji Miti Ovyo ovyo nk.

5. Agenda: Kufunga. Kikao. Miiti - alichukuwa nafasi ya Kuwapongeza Wajumbe kwa Mahudhurio yao na Walivyojitolidi kuchangia Mada na Kufunga Mada Saa 10: 30 jioni

Imethibitishwa na Katibu wa WMA

MOONO. N. PARTIMBO.

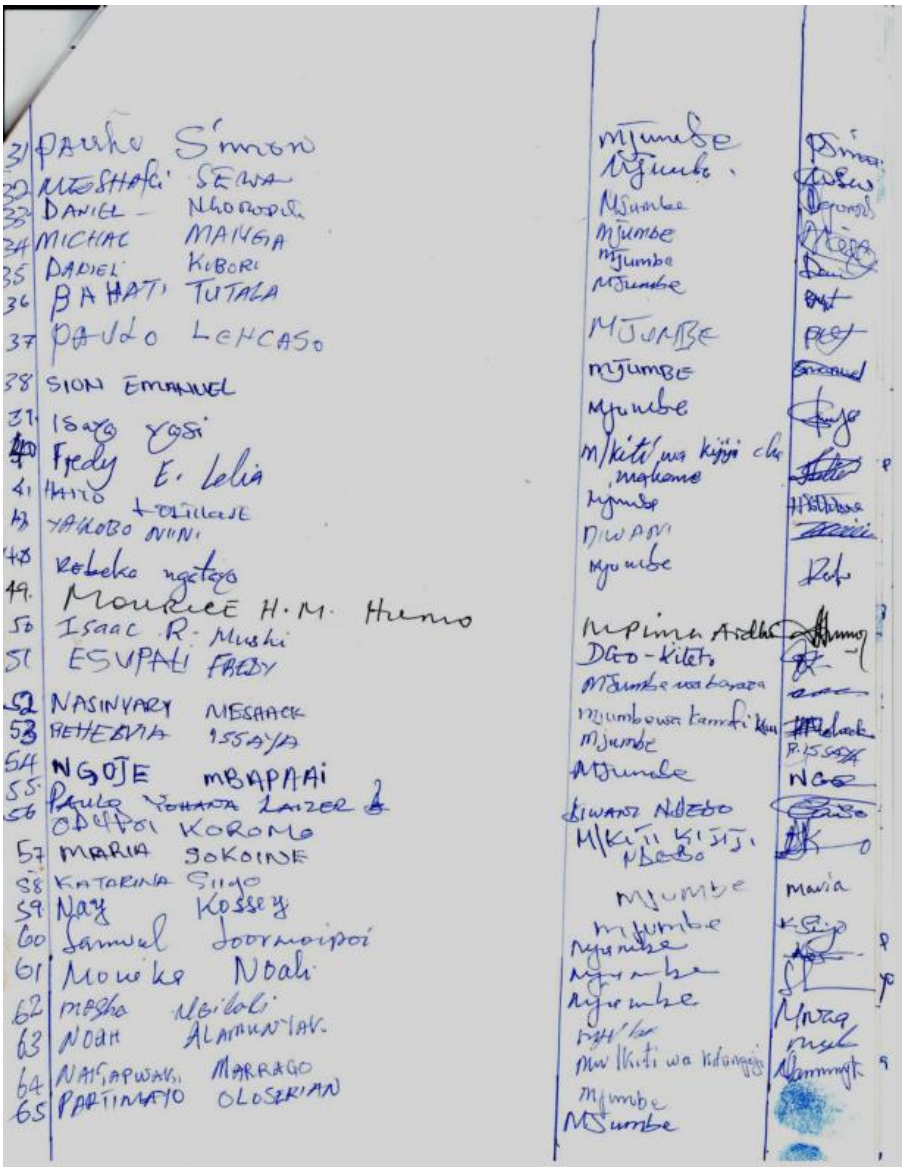
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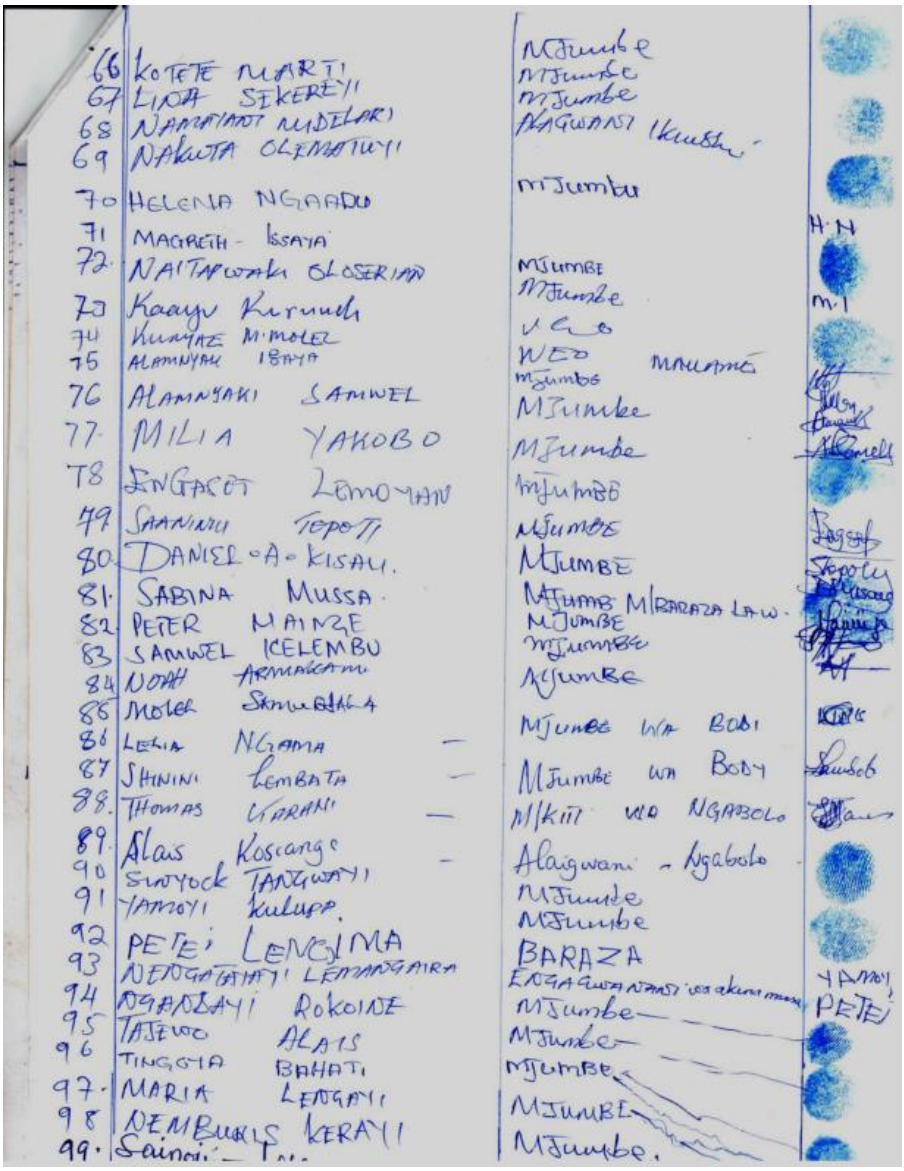
MUHUTASARI WA KIKAO CHA HALMASHAURI KUU WA WMA ILIYOFANYIKA KATIKA OFISI YA WMA MAKAME MAPITIO YA MPANGO WA KANDA YA MATUMIZI WA RASILIMALI YA INDEMA. TAREHE 03.08. 2017.

	JINA	KAMILI.	WADHIFA	SAHIHI.
1.	ELIZABETH	KISAU	MAKAMU M/KITI WMA.	
2.	MOONDI	PARTIMBO	KATIBU WA WMA.	
3	MOKIA S.	OLEMBAIYO	MHASIBU WA WMA	
4	Lendulush	Kenya	M/Kiti - Bodi	
5	Ibrahim	Ole	Afisa tarafa makame	
6.	Samwel K.	Olekao	Katibu wa Bodi	
7	LAZARO	OLE BARALIA	MJUMBE WA JUMUIYA	
8	PAPAAY	SAKA YA	MJUMBE WA JUMUIYA	
9				
10	OLOOO	MBONIKA	mjumb bodi Katikati	
11	WILLIAM	JAPHET	M/KITI - KATIKATI	
12	JOSEPH	WILLIAM	Mjumbe wa Jumuiya	
13	ABRAHAM	OLOOLIGIO	MJumbe	
14	LAIZAR	JOHNSON	mJumbe	
15	LUKAS	NIINI	—— 11 ——	
16	Noiyo	Moya	mjumbe	
17	Marina	Johana	Mjumbe	
18	Mery	Nidalu	Mjumbe	
19	Siay	Pupi	Mjumbe	
20	Helena	Lalaiyock	Mjumbe wa bodi	
21	Nanoto	Hula	Mjumbe	
22	NEMBURIS	ALAMNIAK	MJumbe	
23	NABIMYARI	MTERIAN	BARAZA LA WAKILI MAMBRA	
24	MBOYEL	LUMIA - Millia	mjumbe	
25	MARIA	MOSES	MJumbe	
26	AMANI	ABRAHAM	Mjumbe	
27	ALAIS	LUPEMBE	mJembe	
28	Naserian	Moringati	MJumbe	
29	ALAIS			

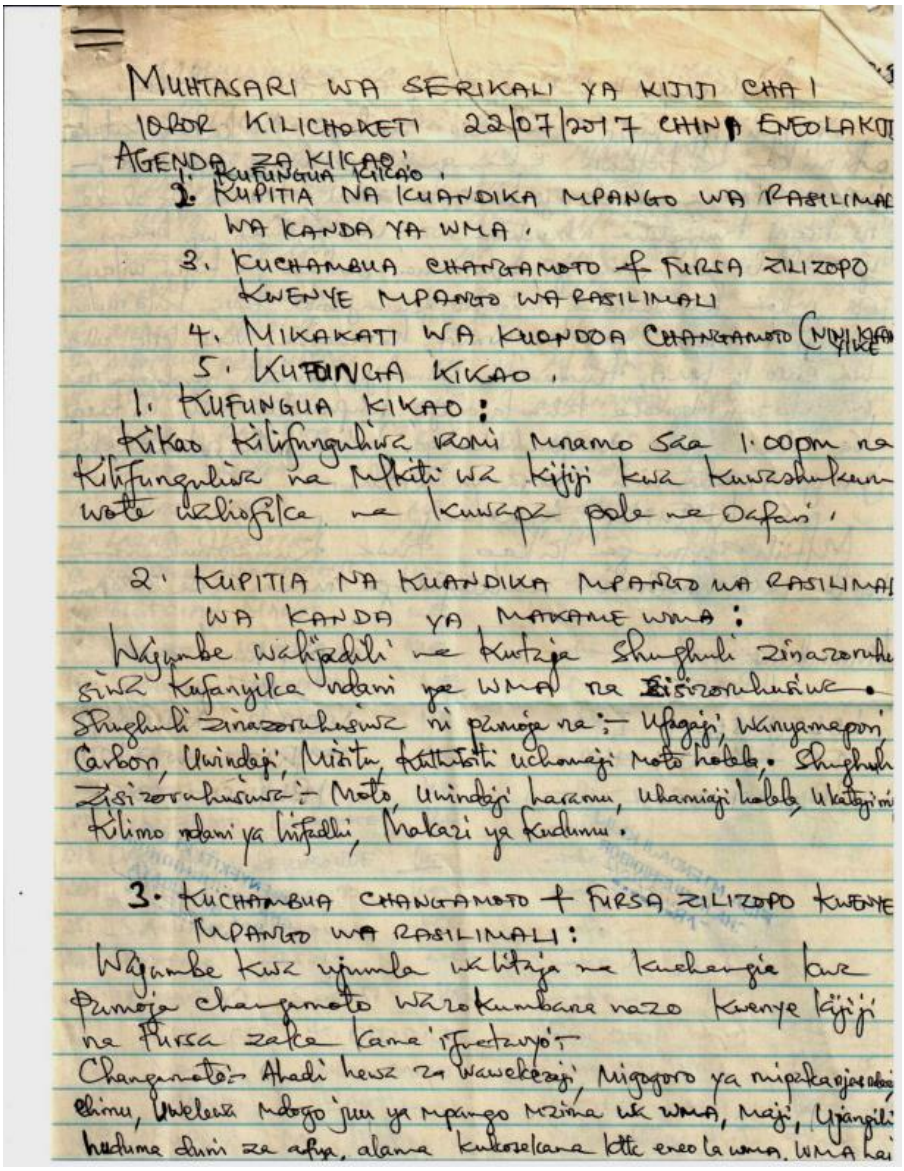
The Resource Management Zone Plan of Makame WMA, Makame WMA.



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The Resource Management Zone Plan of Makame WMA, Makame WMA.



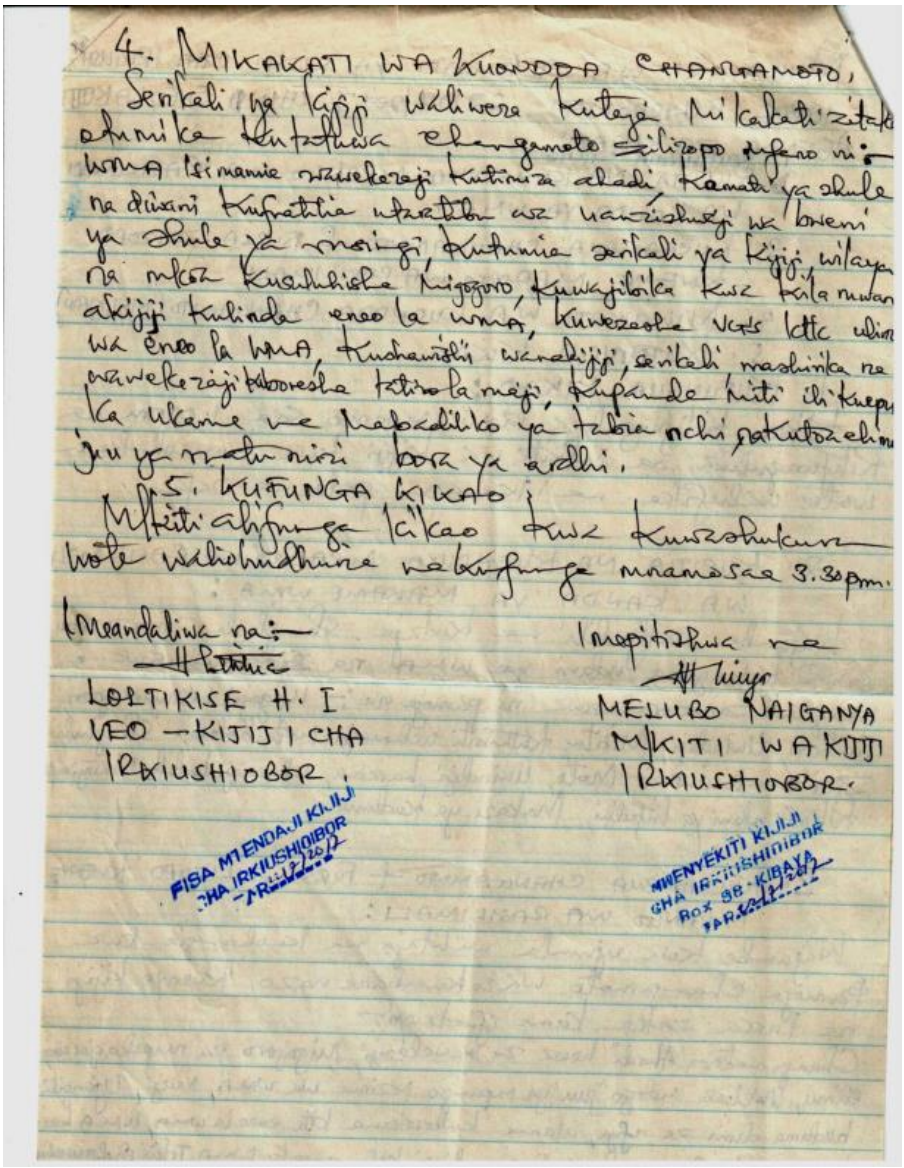
MUHTASARI WA SERIKALI YA KIJIJI CHA I
IOBOR KILICHOKETI 22/07/2017 CHINA ENEOLAKIJI
AGENDA ZA KIKAO:
1. KUFUNGUA KIKAO.
2. KUPITIA NA KUANDIKA MIPANGO WA RASILIMALI WA KANDA YA WMA.
3. KUCHAMBUA CHANGAMOTO & FURSA ZILIZOPO KWENYE MPANGO WA RASILIMALI
4. MIKAKATI WA KUANDOA CHANGAMOTO (NDIYO KAZI YAKE)
5. KUFUNGA KIKAO.

1. KUFUNGUA KIKAO:
Kikao kilifunguliwa rasmi mnamo saa 1:00pm na kufunguliwa na Mkuu wa kijiji kwa kuzishukuru wote waliofika na kuwapa pole na Ofisi.

2. KUPITIA NA KUANDIKA MIPANGO WA RASILIMALI WA KANDA YA MAKAME WMA:
Wajumbe walipeana na kutaja Shughuli zinazoruhusiwa kufanyika ndani ya WMA na zisizoruhusiwa. Shughuli zinazoruhusiwa ni pamoja na:- Ufugaji, Wanyamapori, Carbon, Uwindaji, Utalii, Kuhifadhi uchumaji moto hoteli. Shughuli zisizoruhusiwa:- Moto, Uwindaji haramu, Uharibifu hoteli, Ukataji miti kilimo ndani ya hifadhi, Makazi ya kudumu.

3. KUCHAMBUA CHANGAMOTO & FURSA ZILIZOPO KWENYE MPANGO WA RASILIMALI:
Wajumbe kwa ujumla wa kijiji na kuchangia kwa pamoja changamoto wanazokumbana nazo kwenye kijiji na fursa zake kama ifuatavyo:-
Changamoto:- Ahadi hewa za wawekezaji, Migogoro ya mipaka ya ardhi, Uwelewa mdogo juu ya mpango mzima wa WMA, Maji, Upungufu huduma duni za afya, alama kukosekana kati eneo la wma. WMA hai

The Resource Management Zone Plan of Makame WMA, Makame WMA.



4. MIKAKATI WA KUANZISHA CHANGAMOTO,
Senkeli ya kijiji waliwezo kutaja Mikakati zitakazo
anzishwa changamoto zilizopo ambazo ni:-
WWA isimamie mazingira kutimiza ahadi, kamati ya shule
na diwani kufatilia utekelezaji wa uanzishwaji wa bweni
ya shule ya msingi, kutumia senkeli ya kijiji, vilaya
na mkoa kusaidiasha kijografia, kuwajibika kwa kila mwana
akijiji kulinda eneo la wwa, kuhezesha vyote vilivo
wa eneo la WWA, kuhamasisha wanakijiji, senkeli, mashinka na
mazingira kuboresha katika la maji, kupanda miti ili kuepu
ka ukame wa mabadiliko ya tabia nchi, kutoa elimu
juu ya matumizi bora ya ardhi.
5. KUFUNGA KIKAO;
Mkutiti alifunga kikao kwa kuzishukuru
wote waliohudhuria na kufunga mnamo saa 3.30pm.

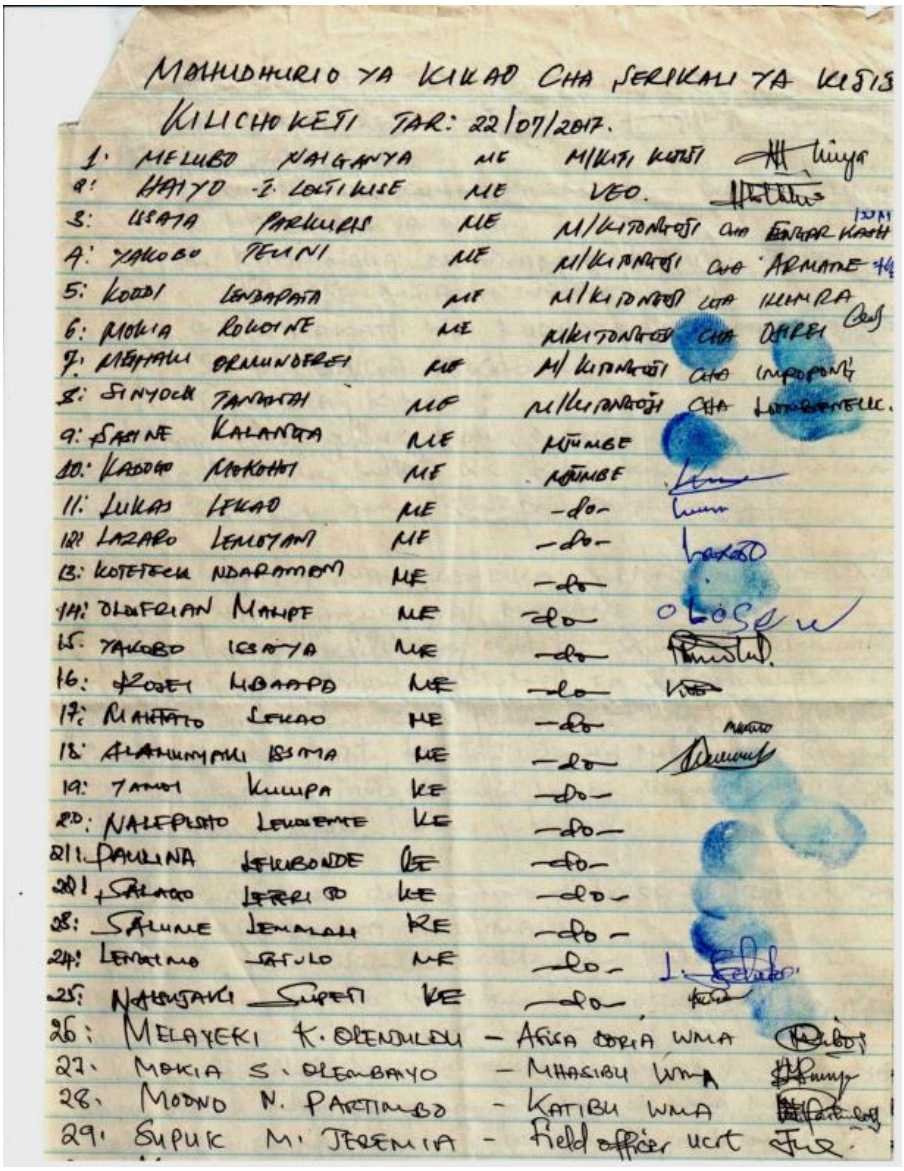
Imeandaliwa na:-
LOLTIKISE H. I
VEO - KIJIJI CHA
IRKUSHIOBOR.

Imepitishwa na
MELUBO NAIGANYA
MKITI WA KIJIJI
IRKUSHIOBOR.

OFISA MTENDAJI KIJIJI
CHA IRKUSHIOIBOR
S.L.P.

MWENYEKITI KIJIJI
CHA IRKUSHIOIBOR
Box 98 - KIBAYA
P.A.R.

The Resource Management Zone Plan of Makame WMA, Makame WMA.

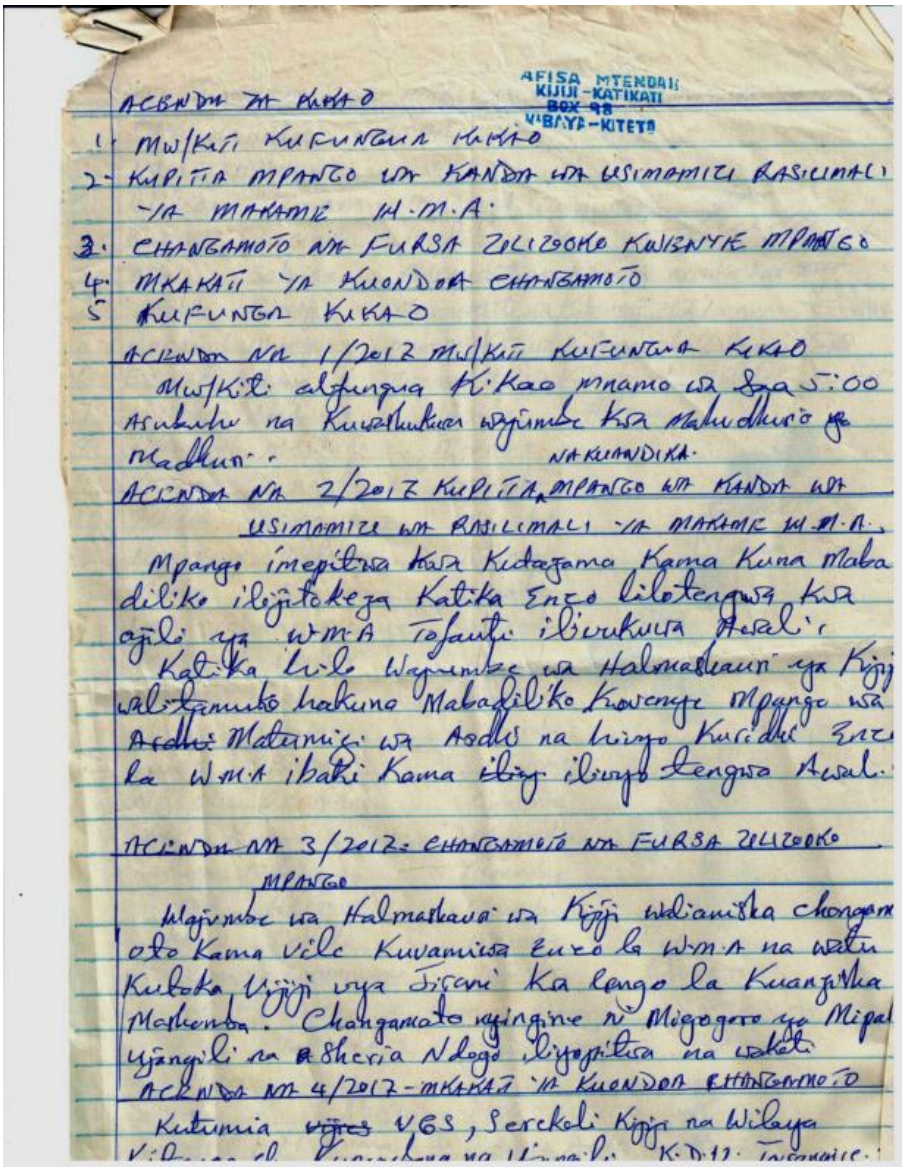


MAHUDHURIO YA KIKAO CHA SERIKALI YA KIJIJI

KILICHOKETI TAR: 22/07/2017.

1:	MELUBO	NAIGANYA	ME	M/KITI, KIJIJI	
2:	HAMYO	Z. LOITILISE	ME	VEO.	
3:	USATA	PARKUAS	ME	M/KITONGOJI	
4:	YAKOBO	TELINI	ME	M/KITONGOJI	
5:	KODDI	LENDAPATA	ME	M/KITONGOJI	
6:	MOLIA	KOLOINE	ME	M/KITONGOJI	
7:	MEPUKAI	ORMUNDRESI	ME	M/KITONGOJI	
8:	SINYOCH	TANGATAI	ME	M/KITONGOJI	
9:	SASINE	KALANGA	ME	MJUMBE	
10:	KADOGO	MOKOHAI	ME	MJUMBE	
11:	LUKAS	LEKAO	ME	-do-	
12:	LAZARO	LEMOYAN	ME	-do-	
13:	KOTEFELA	NDARAMON	ME	-do-	
14:	OLOIFRIAN	MAHIPF	ME	-do-	
15:	YAKOBO	LESHOYA	ME	-do-	
16:	JOSEF	MBAAPA	ME	-do-	
17:	MAITATO	LEKAO	ME	-do-	
18:	ALAMUMPAKI	ISIMA	ME	-do-	
19:	TAMOI	KUMPA	KE	-do-	
20:	NALEPESITO	LEMUEMTE	KE	-do-	
21:	PAULINA	LEKUBONDE	KE	-do-	
22:	SALAMO	LEKERIO	KE	-do-	
23:	SALUNE	LEMAKAI	KE	-do-	
24:	LENAINO	SAMUEL	ME	-do-	
25:	NAISUYAKI	SUPUK	KE	-do-	
26:	MELAYEKI	K. OLENDUKU	-	AFISA ARDHI WMA	
27.	MOKIA	S. OLEMBAYO	-	MHASIBU WMA	
28.	MOONO	N. PARTIMBO	-	KATIBU WMA	
29.	SUPUK	M. JEREMIA	-	Field officer UCRT	

The Resource Management Zone Plan of Makame WMA, Makame WMA.



AFISA MTENDAJI
KIJIJI-KATIKATI
BOX 98
VIBAYA-KITETO

AGENDA ZA KIKAO

1. Mw/Kiti Kufungua Kikao
2. Kupitia Mpango wa Kanda wa Usimamizi Rasilimali Za Makame W.M.A.
3. Changamoto na Fursa Zilizopo Kwenye Mpango
4. Makakati ya Kuondoa Changamoto
5. Kufunga Kikao

AGENDA NA 1/2012 Mw/Kiti Kufungua Kikao

Mw/Kiti alifungua Kikao majira ya Saa 5:00 Asubuhi na Kuwakaribisha wajumbe kisa Mahudhurio ya Madhumi. NA KUHAKIKISHA.

AGENDA NA 2/2012 KUPITIA MPANGO WA KANDA WA USIMAMIZI WA RASILIMALI ZA MAKAME W.M.A.

Mpango imepitiwa kwa Kutazama Kama Kuna Mabadiliko Yaliyotokeza Katika Eneo Liliotengwa kwa ajili ya W.M.A Tofauti Iliyokuwa Awali.

Katika Hilo Wajumbe wa Halmashauri ya Kijiji walitamka hakuna Mabadiliko Kwenye Mpango wa Awali Matumizi wa Awali na hivyo Kuridhi Eneo la W.M.A ibaki Kama ilivyo ilivyo Tengwa Awali.

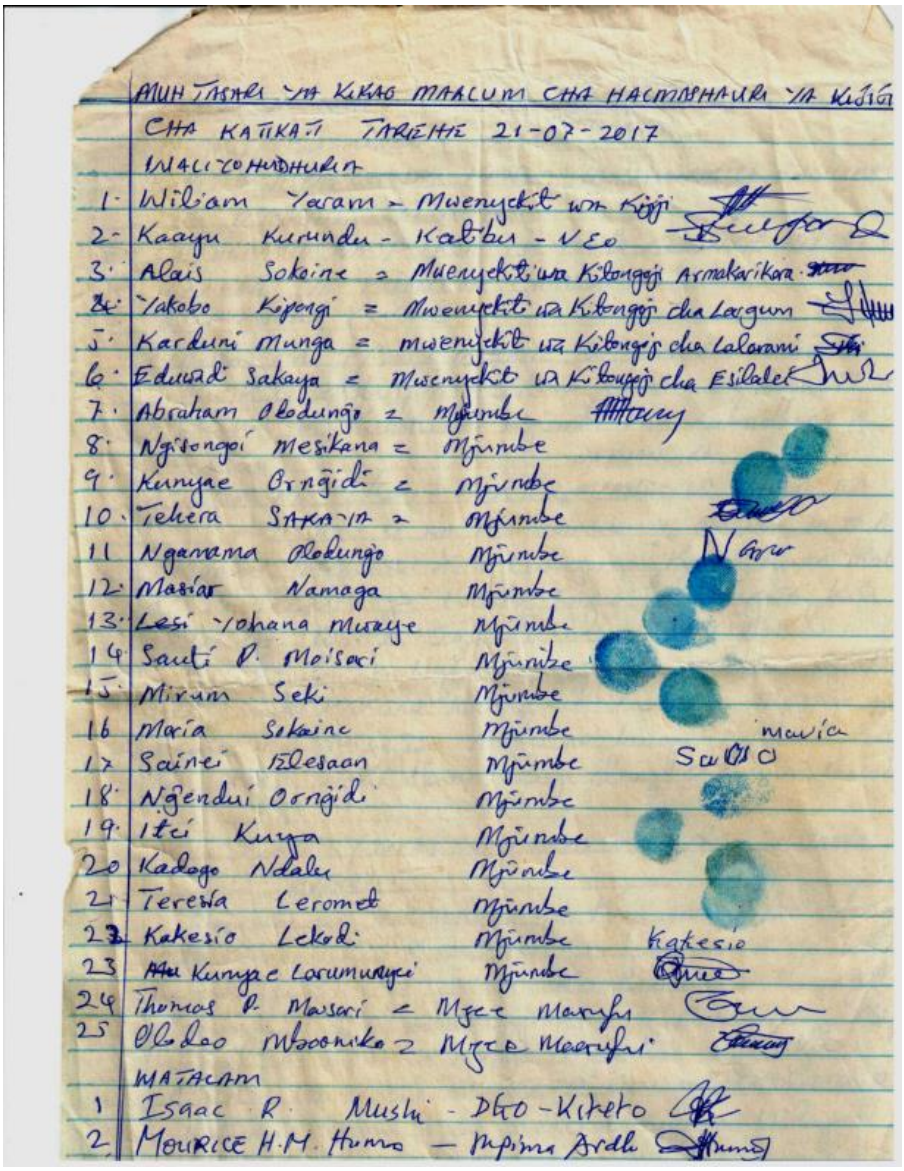
AGENDA NA 3/2012: CHANGAMOTO NA FURSA ZILIZOPO MPANGO

Wajumbe wa Halmashauri ya Kijiji wameeleza changamoto Kama vile Kuvamiwa Eneo la W.M.A na watu Kuloka Vijiji vya Jirani Kwa Lengo la Kuanzisha Makazi. Changamoto nyingine ni Migogoro ya Mipaka Vijiji na Sheria Ndogo Ilizopitisha na Vijiji

AGENDA NA 4/2012 - MKAKATI WA KUONDOA CHANGAMOTO

Kutumia VGS, Serikali Kijiji na Wilaya

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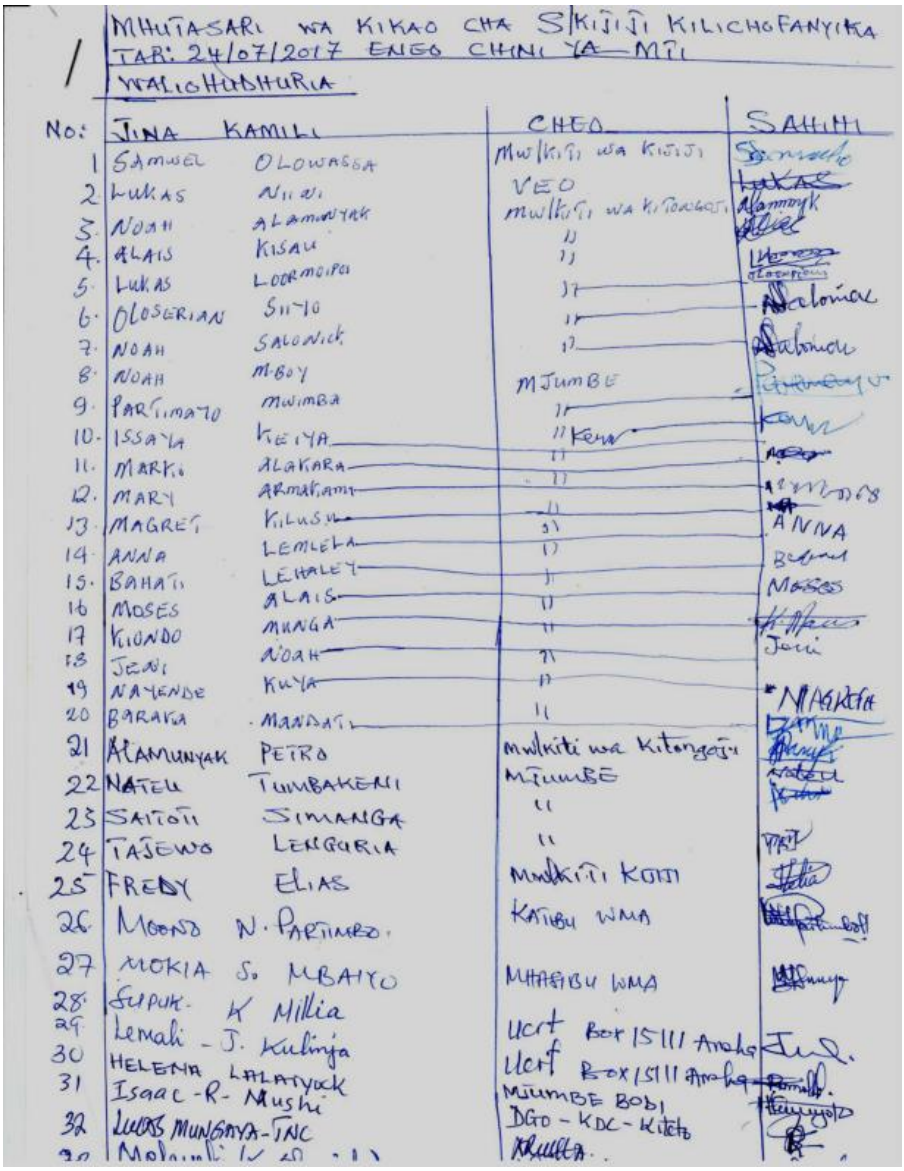
MUHTASARI YA KIKAO MAALUM CHA HALMASHAURI YA KIJIJI
CHA KATIKATI TAREHE 21-07-2017
WALIOHUDHURIA

1. William Yaram - Mwenyekiti wa Kijiji
2. Kaayu Kurundu - Katibu - VEO
3. Alais Sokoine - Mwenyekiti wa Kitongoji Armakarikara
4. Yakobo Kipengi - Mwenyekiti wa Kitongoji cha Largum
5. Karduni Munga - Mwenyekiti wa Kitongoji cha Lalarami
6. Edward Sakaya - Mwenyekiti wa Kitongoji cha Esilalei
7. Abraham Olodungo - Mjumbe
8. Ngitongoi Mesikana - Mjumbe
9. Kunyae Orngidi - Mjumbe
10. Tekera Sakaya - Mjumbe
11. Ngavama Olodungo - Mjumbe
12. Masiar Namaga - Mjumbe
13. Lesi Yohana Muraye - Mjumbe
14. Sauti P. Moisari - Mjumbe
15. Mirum Seki - Mjumbe
16. Maria Sokoine - Mjumbe
17. Sainei Ilesaan - Mjumbe
18. Ngendui Orngidi - Mjumbe
19. Iteti Kunya - Mjumbe
20. Kadogo Ndaleu - Mjumbe
21. Teresia Leromet - Mjumbe
22. Kakesio Lekodi - Mjumbe
23. Kunyae Loremuaigei - Mjumbe
24. Thomas P. Maisori - Mjumbe Mwenyekiti
25. Olodoo Mbooniko - Mjumbe Mwenyekiti

MATAKAM

1. Isaac R. Mushi - DLO - Kiteto
2. Maurice H.M. Humo - Mpima Ardhi

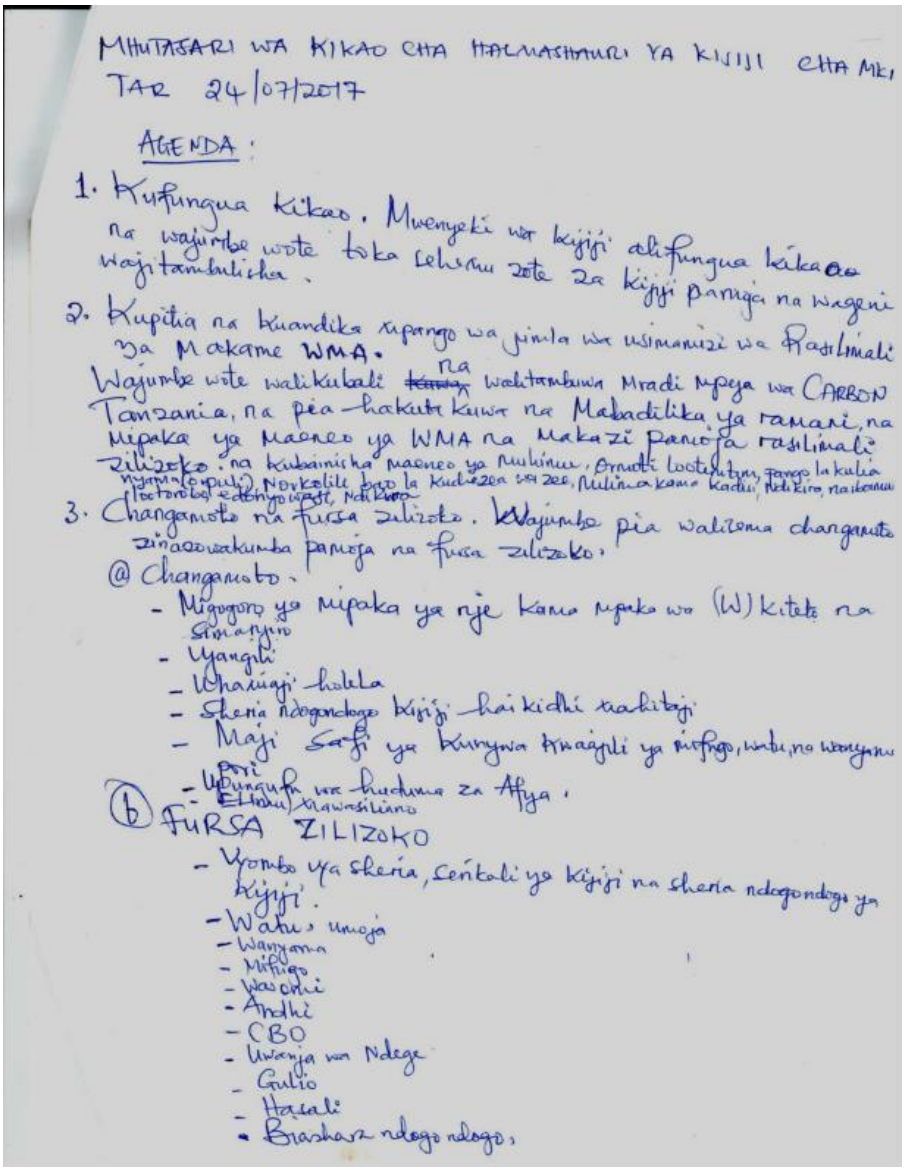
The Resource Management Zone Plan of Makame WMA, Makame WMA.



MHUTASARI WA KIKAO CHA S/KIJIJI KILICHOFANYIKA TAR: 24/07/2017 ENEO CHINI YA MTI WALIOHUDHURIA

No:	JINA	KAMILI	CHEO	SAHIHI
1	SAMUEL	OLOWASSA	MWKITI WA KIJIJI	
2	LUKAS	NJIVI	VEO	
3	NOAH	ALAMUNYAK	MWKITI WA KITONGOJI	
4	ALAIS	KISAU	〃	
5	LUKAS	LOOKMOIPO	〃	
6	OLOSERIAN	SIITO	〃	
7	NOAH	SALONICK	〃	
8	NOAH	M-BOY	MJUMBE	
9	PARTIMATO	MWIMBA	〃	
10	ISSAYA	KEIYA	〃 Kenya	
11	MARKO	ALAKARA	〃	
12	MARY	ARMATIAMI	〃	
13	MAGRETI	KILUSU	〃	AIVIVA
14	ANNA	LEMLELA	〃	
15	BAHATI	LEHALEY	〃	
16	MOSES	ALAIS	〃	
17	KIONDO	MUNGA	〃	
18	JEAN	NOAH	〃	
19	NAYENDE	KUYA	〃	
20	BARAKA	MANDATI	〃	
21	ALAMUNYAK	PETRO	MWKITI WA KITONGOJI	
22	NATEU	TUMBAKENI	MJUMBE	
23	SAITOTI	SIMANGA	〃	
24	TASEWO	LENGURIA	〃	
25	FREDY	ELIAS	MWKITI KOTI	
26	MOONDI	N. PARTIMBO	KATIBU WMA	
27	MOKIA	S. MBAIYO	MHASIBU WMA	
28	SUPUK	K Milia		
29	Lemaki	J. Kulinja		
30	HELENA	LALAYUCK	Ucrt Box 15111 Arusha	
31	Isaac	R. Mushi	Ucrt Box 15111 Arusha	
32	LUCAS	MUNSANYA-TNC	MJUMBE BODI	
			DGO - KDC - Kitefa	

The Resource Management Zone Plan of Makame WMA, Makame WMA.



MHUTASARI WA KIKAO CHA HALMASHAURI YA KIJIJI CHA MK,
TAR 24/07/2017

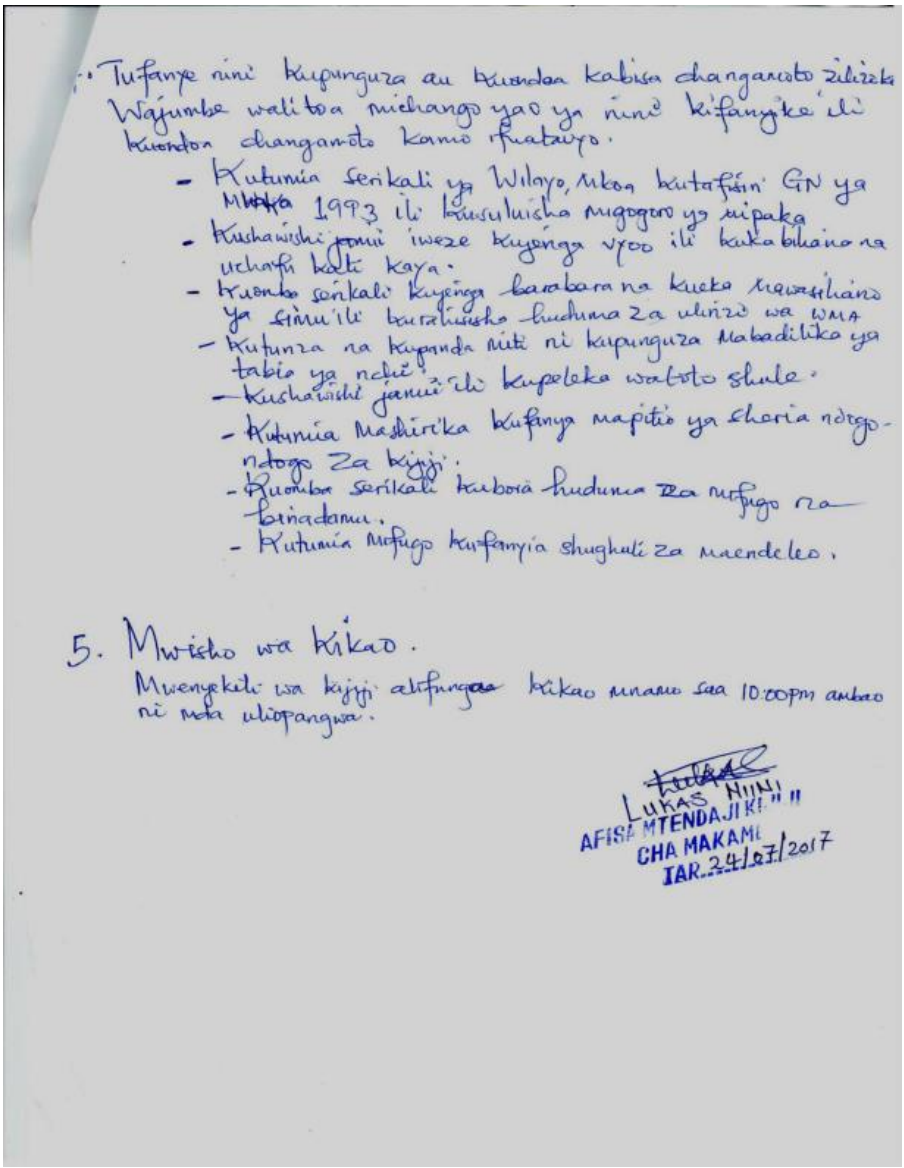
AGENDA:

1. Kufungua kikao. Mwenyekiti wa kijiji alifungua kikao na wajumbe wote toka Lehsmu zote za kijiji pamoja na Wageni Wajitambulisha.
2. Kupitia na kuandika rupango wa jinsi wa usimamizi wa Rasilimali ya Makame WMA. Wajumbe wote walikubali ~~kama~~ na wakitambuwa Mradi Mpeya wa CARBON Tanzania, na pia-hakuta kuwa na Mabadiliko ya ramani, na Mipaka ya Maeneo ya WMA na Makazi pamoja rasilimali Zilizoko. na kubainisha maeneo ya mukimu, Ormoti Lootukutun, pango la kulia nyumbu (Lotorobi edonyo Ngai, Nalkuo
3. Changamoto na fursa zilizoko. Wajumbe pia walizema changamoto zinazowakumba pamoja na fursa zilizoko.

@ Changamoto.
- Migogoro ya mipaka ya nje kama mpaka wa (W) kitete na Simanjiro
- Uyangili
- Uharibifu-holela
- Sheria ndogondogo kijiji-hai kidhi mahitaji
- Maji Safi ya kunywa kwa wanyama pori
- Upungufu wa huduma za Afya.
- Elimu/mawasiliano

(b) FURSA ZILIZOKO
- Uwepo wa sheria, Kanuni za kijiji na sheria ndogondogo za kijiji.
- Watu, umoja
- Wanyama
- Mifugo
- Wasanii
- Andhi
- CBO
- Uwepo wa Ndege
- Gulio
- Hasali
- Biashara ndogo ndogo,

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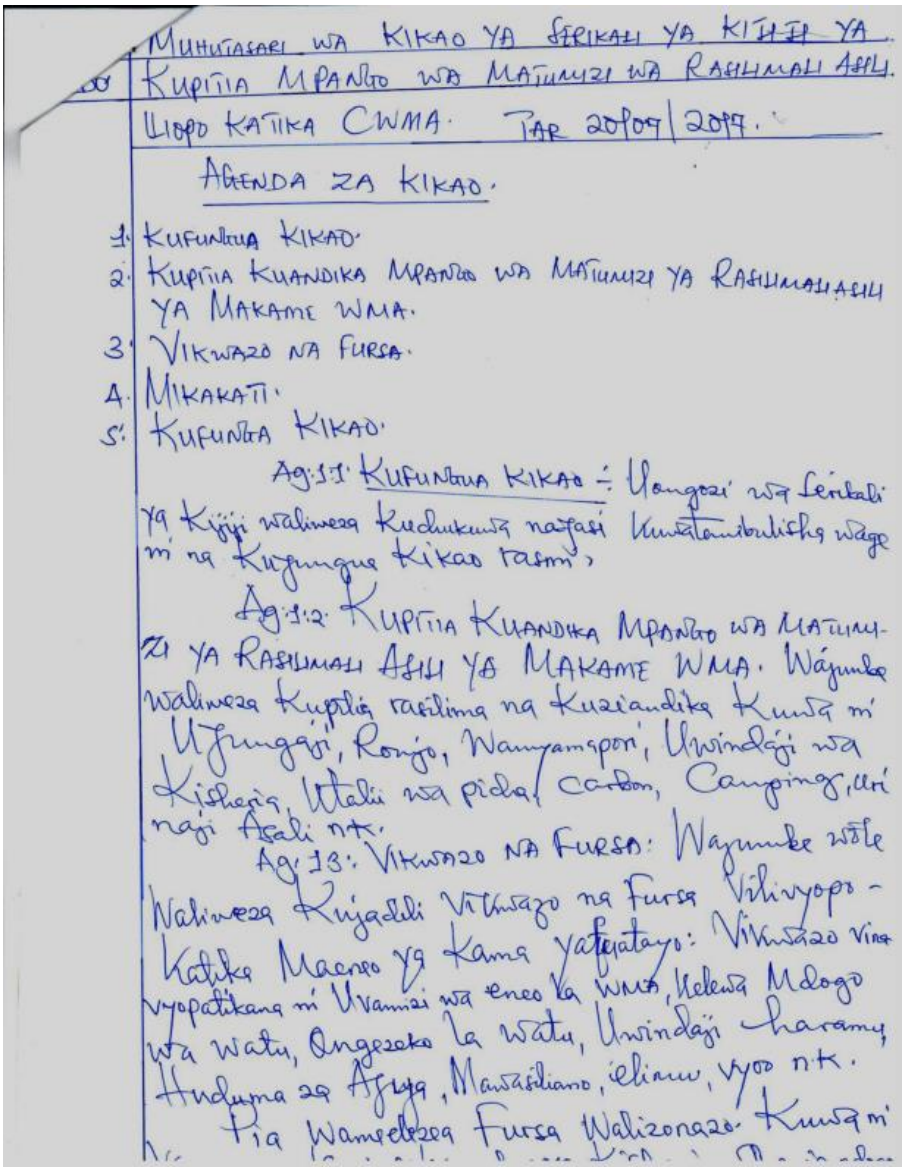
- Tufanye nini kupunguza au kuondoa kabisa changamoto zilizoka Wajumbe walitoa michango yao ya nini kifanyike ili kuondoa changamoto kama zifuatazo.
  - Kutumia serikali ya Wilaya, sheria kutafsiri GN ya Mkaka 1993 ili kusuluisha migogoro ya mipaka
  - Kushawishi jamii iweze kuyenga vyoo ili kuka bihana na uchafu kati kaya.
  - Kuondoa serikali kuyenga barabara na kueka mawasiliano ya simu'ili kurahisisha huduma za ulinzi wa WMA
  - Kutunza na kupanda miti ni kupunguza Mabadiliko ya tabia ya nchi!
  - Kushawishi jamii ili kupeleka watoto shule.
  - Kutumia Mashirika kufanya mapitio ya sheria ndogo-ndogo za kijiji.
  - Kuondoa serikali kuboa huduma za mifugo na binadamu.
  - Kutumia Mifugo kufanyia shughuli za maendeleo.

5. Mwisho wa kikao.

Mwenyekiti wa kijiji atifunga kikao mnamo saa 10:00pm ambao ni muda uliopangwa.

LUKAS NJINI
AFISA MTENDAJI KIJIJI
CHA MAKAMI
TAR. 24/07/2017

The Resource Management Zone Plan of Makame WMA, Makame WMA.



MUHUTASARI WA KIKAO YA SIRIKALI YA KIJIJI YA KUPITIA MPANGO WA MATUMIZI WA RASILIMALI ASILI. ULIOPO KATIKA CWMA. TAR 20/09/2019.

AGENDA ZA KIKAO.

1. KUFUNGUA KIKAO.
2. KUPITIA KUANDIKA MPANGO WA MATUMIZI YA RASILIMALI ASILI YA MAKAME WMA.
3. VIKWAZO NA FURSA.
4. MIKAKATI.
5. KUFUNGA KIKAO.

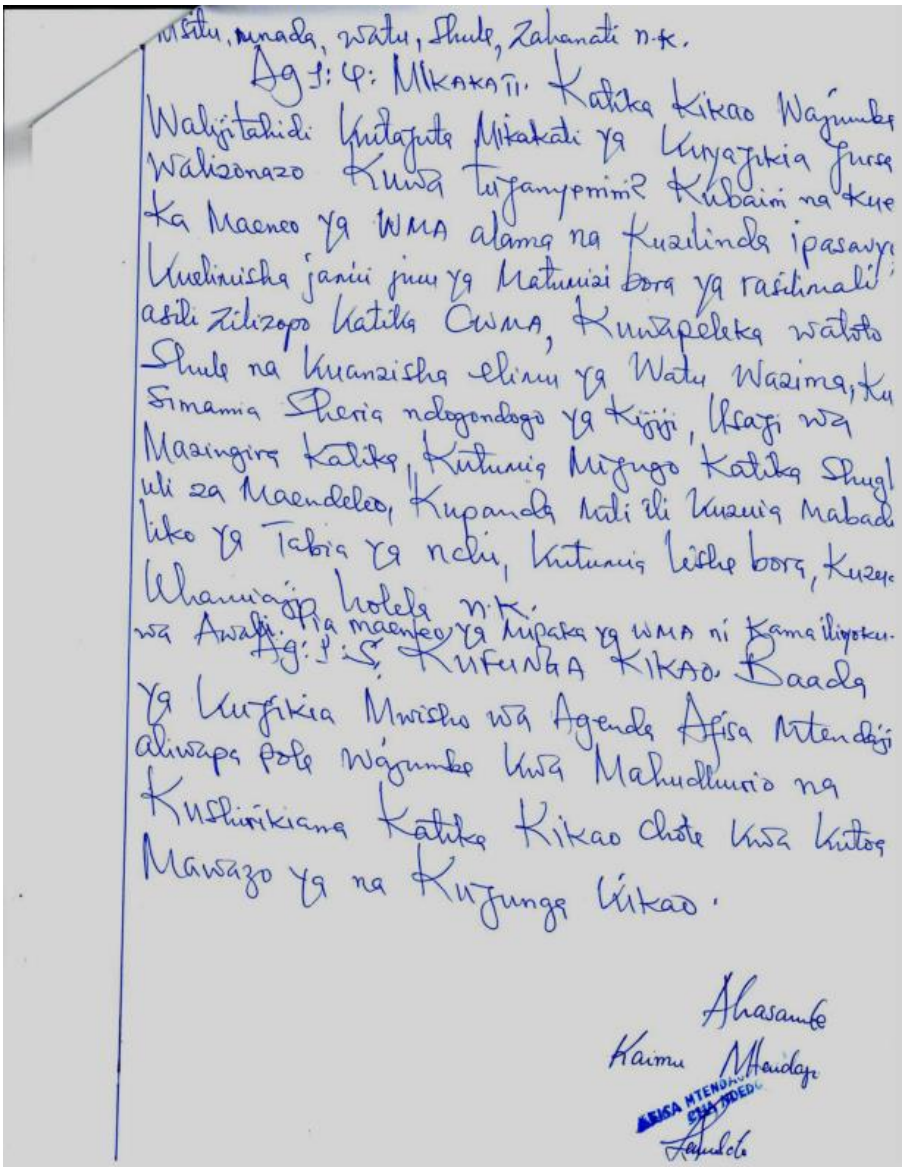
Ag:1:1. KUFUNGUA KIKAO :- Uongozi wa Serikali ya Kijiji walianza kwa kutoa nafasi kwa Mwenyekiti wa Bodi ili aweze kufungua kikao rasmi.

Ag:1:2. KUPITIA KUANDIKA MPANGO WA MATUMIZI YA RASILIMALI ASILI YA MAKAME WMA. Wajumbe walianza kupitia rasilimali na kuziandika kuwa ni Uzungaji, Ranjo, Wanyamapori, Uwindaji wa kisheria, Utalii wa picha, Carbon, Camping, Miti ngazi Asali n.k.

Ag:1:3. VIKWAZO NA FURSA: Wajumbe wote walianza kujadili Vikwazo na Fursa Vilivyopo katika Maeneo ya kama yafuatayo: Vikwazo vina vyopatikana ni Uvamizi wa eneo la WMA, Ukosefu Mdogo wa Watu, Ongezeko la watu, Uwindaji haramu, Uduma za Afya, Mawasiliano, elimu, vyoo n.k.

Pia Wameelezea Fursa Walizonazo. Kuwa ni

The Resource Management Zone Plan of Makame WMA, Makame WMA.



Mwisho, Nyanda, Watu, Shule, Zahanati n.k.

Ag 1: 4: MKAKATI. Katika Kikao Wajumbe Walijitahidi Kutafuta Mikakati ya Kuyafikia Yote Waliyoyaona Kuwa Yanayomimi? Kubainisha na Kuelezea ya Maeneo ya WMA alama na Kuzilinda ipasavyo; Kuelimisha jamii juu ya Matumizi bora ya rasilimali asili Zilizopo katika CWMA, Kuwapeleka watoto Shule na Kuanzisha elimu ya Watu Wazima, Kuimamia Sheria ndogondogo ya Kijiji, Ukaji wa Mazingira katika, Kutunza Mjengo katika Shughuli za Maendeleo, Kupanda miti ili Kuzuia Mabadiliko ya Tabia ya nchi, Kutunza Vitabu bora, Kuzuia Uhamiaji holela n.k.

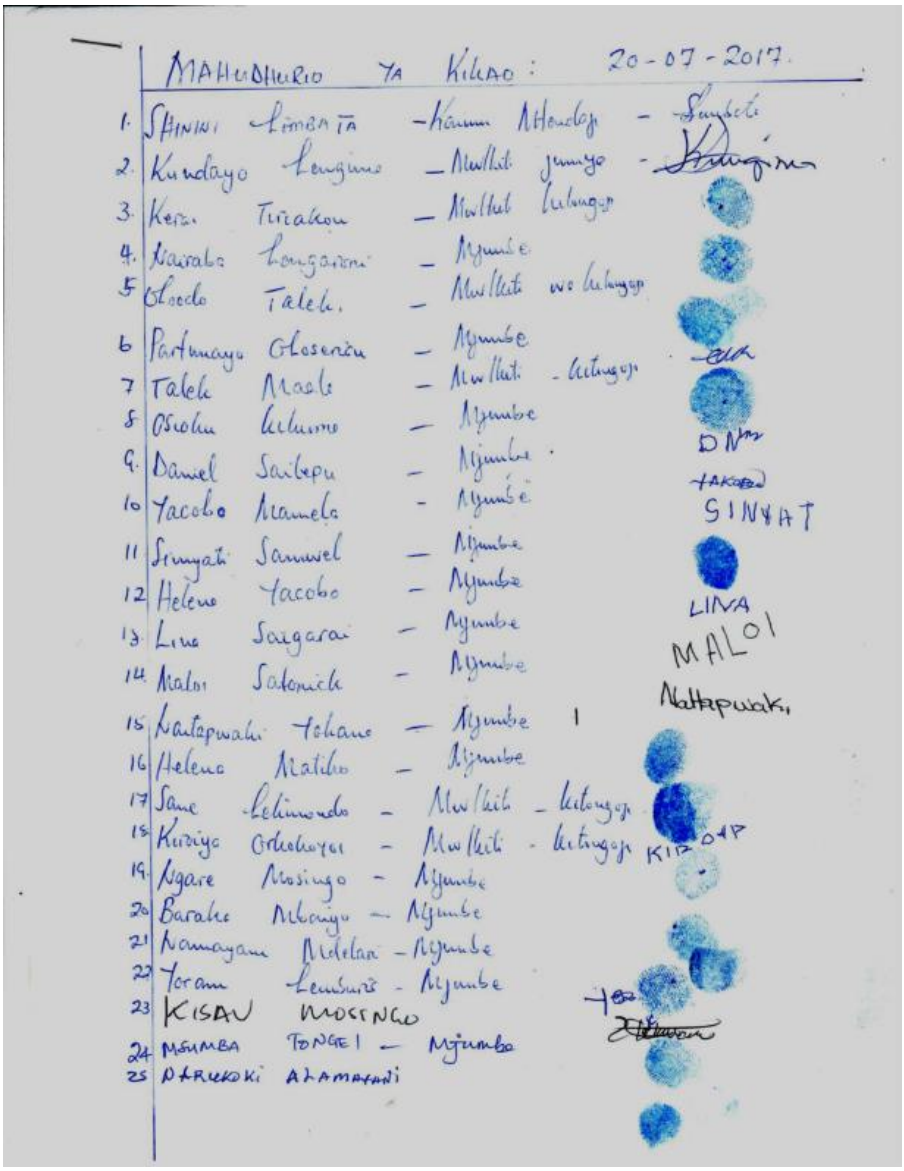
wa Awali. Ya maeneo ya Mipaka ya WMA ni Kama ilivyokuwa Ag: 1: 5: KUFUNGA KIKAO. Baada ya Kufikia Mwisho wa Agenda Afisa Mtendaji alitoa pole Wajumbe kwa Mahudhurio na Kushirikiana katika Kikao chote kwa kutoa Mawazo ya na Kujunga Kikao.

Ahasante

Kaimu Mwenyekiti

AFISA MTENDAJI KIJIJI

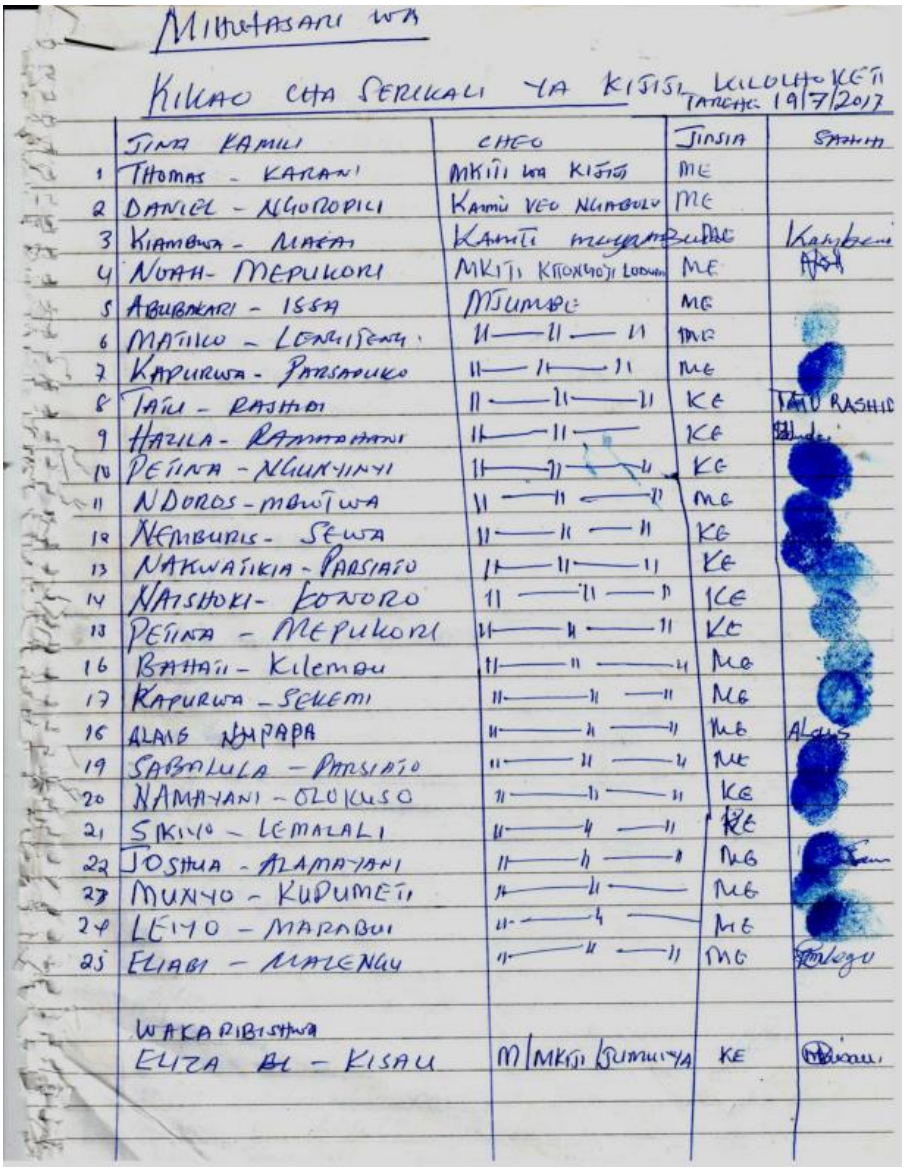
The Resource Management Zone Plan of Makame WMA, Makame WMA.



MAHUDHURIO YA KIKAO: 20-07-2017.

1. SHINKI Lomata – Kaimu Mhandisi – Sahbeti
2. Kundayo Lengima – Mwalimu Jumuya –
3. Kesi Tirtaikou – Mwalimu Kitunguu
4. Nasaba Longaroni – Mjumbe
5. Chacha Taleki. – Mwalimu wa kitunguu
6. Partmaya Gloseriu – Mjumbe
7. Taleki Masale – Mwalimu – kitunguu
8. Osioku Kitumo – Mjumbe
9. Daniel Saibepu – Mjumbe DN
10. Yacobo Mamela – Mjumbe SINYAT
11. Sengata Samwel – Mjumbe
12. Helena Yacobo – Mjumbe LIMA
13. Lina Sangarai – Mjumbe MALOI
14. Maloi Salomick – Mjumbe Nalepuak.
15. Nalepuaki Yohana – Mjumbe
16. Helena Mariko – Mjumbe
17. Sane Lekimondo – Mwalimu – kitunguu
18. Kisiya Ochokoyoi – Mwalimu – kitunguu KIS
19. Ngare Masingo – Mjumbe
20. Baraka Mbonyo – Mjumbe
21. Namayana Nderian – Mjumbe
22. Toram Lemburo – Mjumbe
23. KISAU MOSINGO
24. MSUMBA TONGEI – Mjumbe
25. ATUKOKI ALAMAYANI

The Resource Management Zone Plan of Makame WMA, Makame WMA.

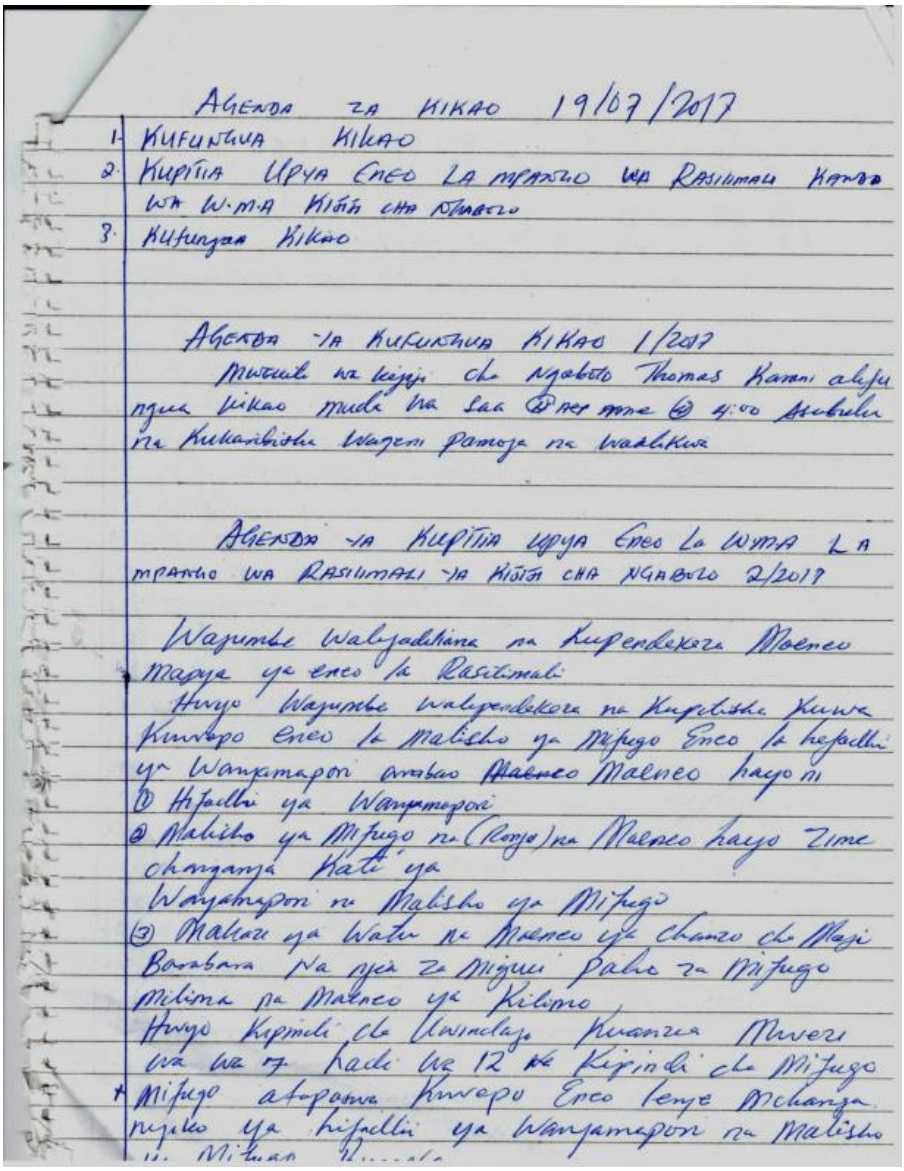


MKUTASANI WA

KIKAO CHA SERIKALI YA KIJIJI KILOLHO KETI TAREHE 19/7/2017

	JINA KAMILI	CHEO	JINSIA	SAHIHI
1	THOMAS - KATANI	MKUU WA KIJIJI	ME	
2	DANIEL - NGONDICI	KAMU VEO NGAMBOLO	ME	
3	KIAMBWA - NAIKA	KAMATI		
4	NOAH - MEPUKORI	MKUU KITONGOJI	ME	
5	ABUBAKARI - ISSA	MJUMBE	ME	
6	MATILDO - LOKUSENYA	〃	ME	
7	KAPURWA - PARSAPUKO	〃	ME	
8	TAIL - RASHIDI	〃	KE	TAU RASHID
9	HAZILA - RAMADHANI	〃	KE	
10	PETINA - NGUNYINYI	〃	KE	
11	NDOROS - MBUTWA	〃	ME	
12	NEMBURIS - SEWA	〃	KE	
13	NAKWAIKIA - PARSIAFO	〃	KE	
14	NAISHOKI - KONORO	〃	KE	
15	PETINA - MEPUKORI	〃	KE	
16	BAHATI - KILEMBU	〃	ME	
17	KAPURWA - SEKEMI	〃	ME	
18	ALAIS NAPAPA	〃	ME	ALAIS
19	SABALULA - PARSIAFO	〃	ME	
20	NAMAYANI - OLOKUSO	〃	KE	
21	SIKIYO - LEMALALI	〃	KE	
22	JOSHUA - ALAMAYANI	〃	ME	
23	MUNYO - KUDUMETI	〃	ME	
24	LEIYO - MARABUI	〃	ME	
25	ELIABI - MALENGU	〃	ME	
	WAKAIBISHWA			
	ELIZA BL - KISALU	M/MKUU MUMUNYA	KE	

The Resource Management Zone Plan of Makame WMA, Makame WMA.



AGENDA ZA KIKAO 19/07/2017

1. KUFUNGUA KIKAO
2. KUPITIA UPYA ENEO LA MPAKANO WA RASILIMALI KATIKA WA W.M.A KIJIJI CHA NGABOLO
3. KUFUNGA KIKAO

AGENDA YA KUFUNGUA KIKAO 1/2017

Mwenyekiti wa kijiji cha Ngabolo Thomas Kamani alifungua kikao mnde wa saa @ asubuhi @ 4:00 Asubuhi na kukaribisha wageni pamoja na wanakijiji

AGENDA YA KUPITIA UPYA ENEO LA WMA LA MPAKANO WA RASILIMALI YA KIJIJI CHA NGABOLO 2/2017

Wajumbe walijadiliana na kupendekeza Maeneo Maeneo ya eneo la Rasilimali

Hivyo Wajumbe walipendekeza na kupitisha kuwa kwanpo eneo la Malisho ya Mifugo Eneo la hifadhi ya Wanyamapori awabao Maeneo Maeneo hayo ni

① Hifadhi ya Wanyamapori

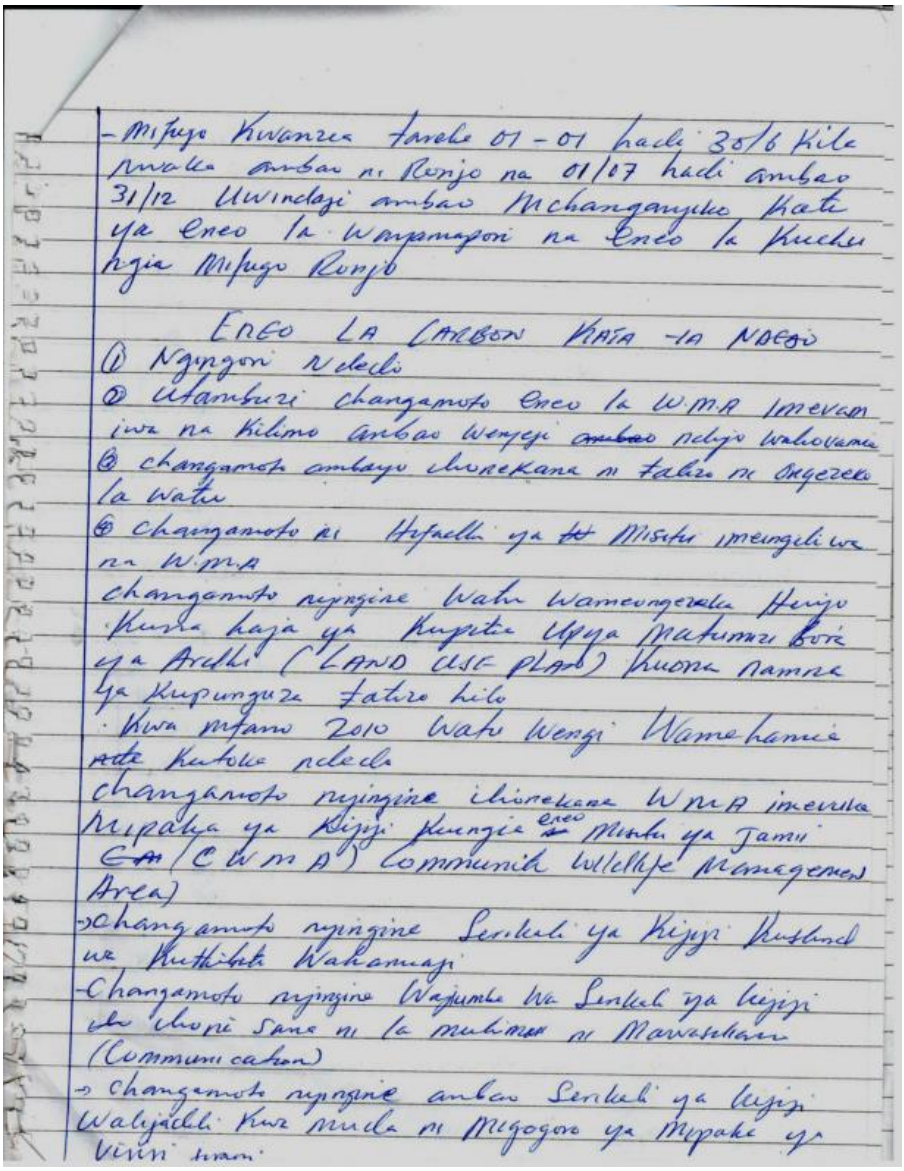
② Malisho ya Mifugo na (Rangi) na Maeneo hayo Zime changanya Kati ya Wanyamapori na Malisho ya Mifugo

③ Maliasi ya Wate na Maeneo ya Chanzo cha Maji Barabara Na njia za Mifugo Pahe za Mifugo Milima na Maeneo ya Kilimo

Hivyo Kipindi cha Uwindaji kuanzia Novemba wa wa 7 Kadi wa 12 ka Kipindi cha Mifugo

4. Mifugo atapoma kwanpo Eneo lenye Mchanga nyeko ya hifadhi ya Wanyamapori na Malisho

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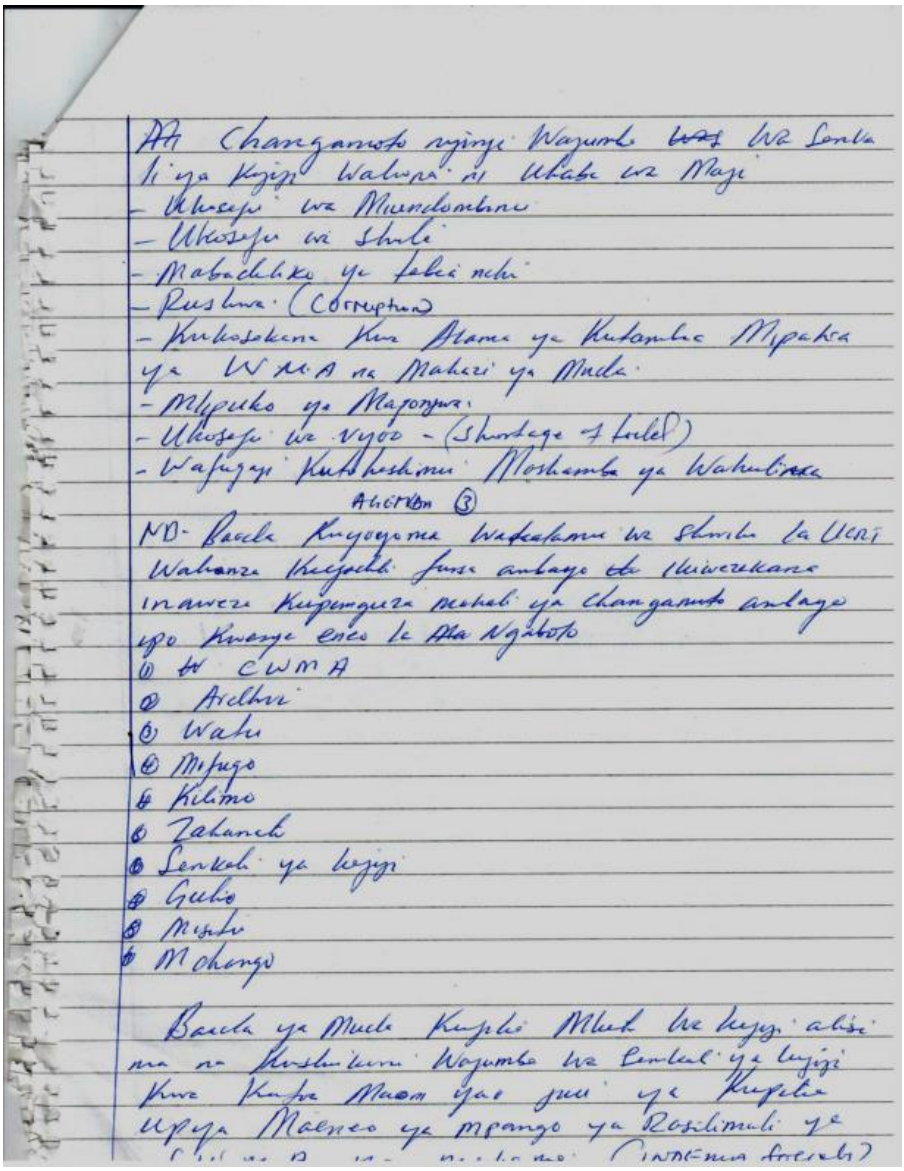


- Mipaka kwanzia tarehe 01-01 hadi 30/6 kila mwaka ambao ni Ronjo na 01/07 hadi ambao 31/12 Uwindaji ambao Mchanganyiko kati ya eneo la Wanyamapori na Eneo la Kuchezea ngia Mipaka Ronjo

ENEO LA CARBON KATA -IA NDEGO

① Ngingoni Ndeche
② Utamburi changamoto Eneo la W.M.A imevamiwa na kilimo ambao wenyeji ~~ambao~~ ndiyo wahovamia
③ changamoto ambayo inakekana ni tatizo ni ongezeko la Watu
④ Changamoto ni Hifadhi ya ~~tt~~ Misitu imeingiliwa na W.M.A
changamoto nyingine Watu wameongezeka Hivyo kuna haja ya kupitia upya matumizi bora ya Ardhi (LAND USE PLAN) kuona namna ya kupunguza tatizo hilo
· Kwa mfano 2010 Watu wengi Wamehamia ndani kutoka ndeche
changamoto nyingine inakekana WMA imeanza Mipaka ya Kijiji kuingia eneo ~~la~~ Mtu ya Jamii (CWMA) community wildlife Management Area)
→ changamoto nyingine Serikali ya Kijiji kuzuia wa kuchinja Wahamiaji
- changamoto nyingine Wajumbe wa Serikali ya kijiji ~~ku~~ chache sana ni la mahimiza ni Mawasiliano (Communication)
→ changamoto nyingine ambao Serikali ya kijiji Waliyaki kwa mida ni Migogoro ya Mipaka ya Vijiji jirani

The Resource Management Zone Plan of Makame WMA, Makame WMA.



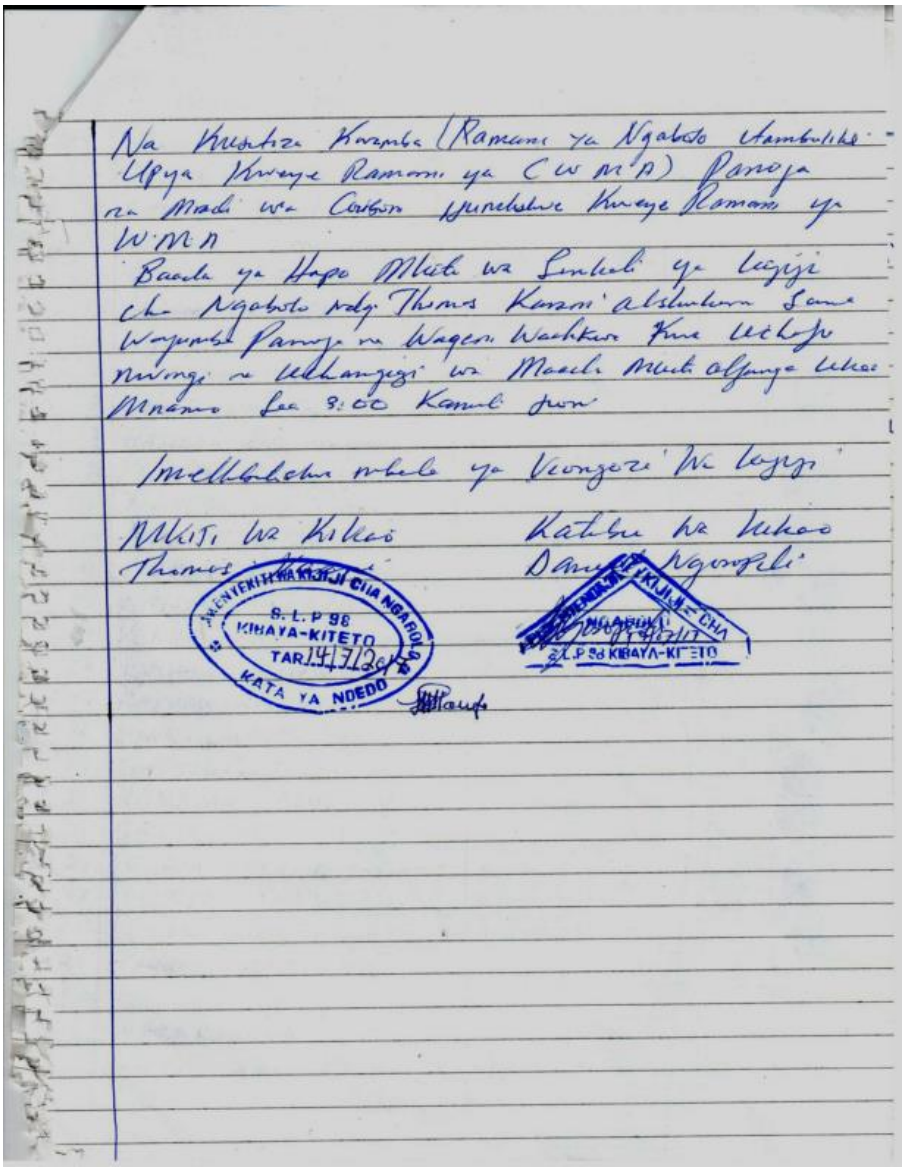
Ati Changamoto zinyi Wazumbe ~~wa~~ wa Sonla
li ya kujiji Walwa ni Ubabe wa Maji
- Ukosefu wa Miundombinu
- Ukosefu wa Shule
- Mabadiliko ya tabia nchi
- Rushwa (Corruption)
- Kukosekana kwa Amani ya Kutambua Mipaka
ya WMA na Maeneo ya Mila
- Migogoro ya Mipaka
- Ukosefu wa vyoo - (Shortage of toilet)
- Wafugaji Kutoshirikishwa Mashamba ya Wakulima

Attention (3)

ND- Baada Kujadiliwa Wadaakama wa Shule la Ucri
Walianza Kujadili Juu ambayo Ili Kuweza Kuanza
Kupunguza Mahali ya Changamoto ambayo
upo Kwanza ENDS Ili Ata Ngabobo
① Ni CWMA
② Ardhini
③ Wahi
④ Mifugo
⑤ Kilimo
⑥ Jahanch
⑦ Lenkoli ya Kujiji
⑧ Gubo
⑨ Nyuki
⑩ Mchango

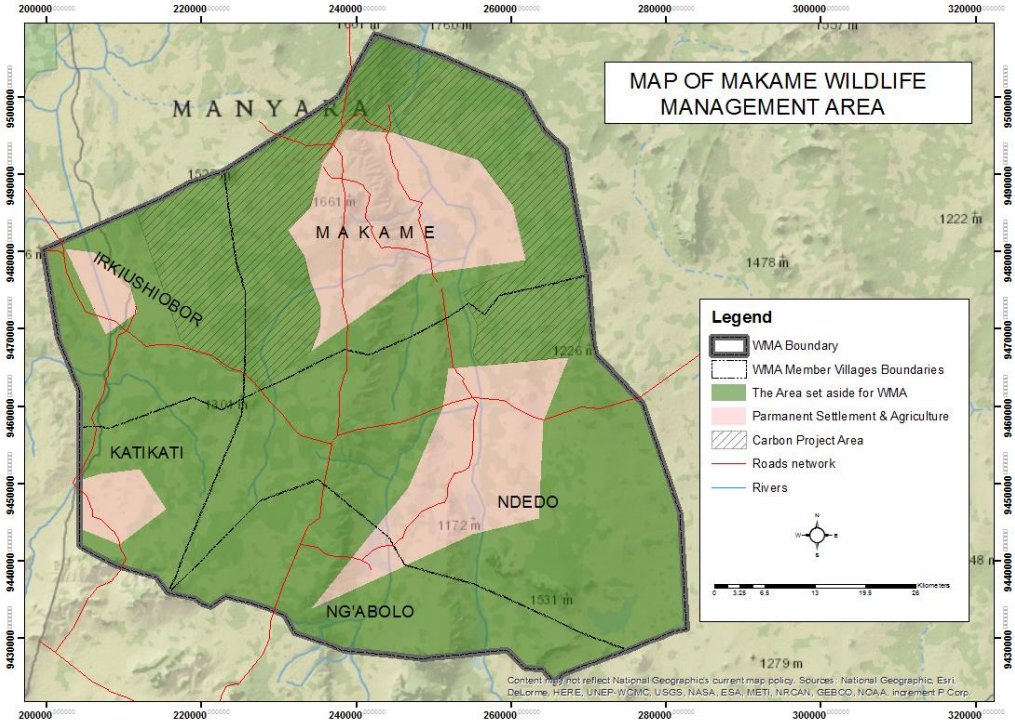
Baada ya Mila Kujadili Mlenk wa Kujiji alisi
ma na Kushirikiana Wazumbe wa Lenkoli ya Kujiji
Kuwa Kuna Mambo yao yani ya Kupitia
Upya Maeneo ya Mpango ya Kosilimali ya
(INDIGENOUS FOREST)

The Resource Management Zone Plan of Makame WMA, Makame WMA.



The Resource Management Zone Plan of Makame WMA, Makame WMA.

Annex 4: Location Map of the Makame WMA Wildlife Management Area



The Resource Management Zone Plan of Makame WMA, Makame WMA.

Annex 6: Office Bearers of the Society, their Qualifications and Tenure.

No	Title	Name of office bearer	Village	Qualification	Tenure (From-to)
A.	**MWMA Trustees:**				
1	Parton	Lendukushi Keiya	Makame	BA Planning	2012-2017
2	Trustee	Samwel Korinja	Irkiushi-oibor	MSc Environmental Management	2012-2017
3	Trustee	Hellena Lalayok	Kibaya	Certificate in Education	2015-2017
4	Trustee	Edward Lekaita	Makame	LLM	2012-2017
B.	**Executive Committee:**				
1	Chairman	Kundayo Lengima	Ndedo	Certificate of Primary Education	2012-2017
2	Vice Chairman	Elizabeth Kisau	Ng'abolo	Certificate of Primary Education	2016-2017
3	Secretary	Moono Partimbo	Makame	Certificate of Secondary School Education (CSSE)	2016-2017
4	Treasurer	Supuk Ole Kao	Irikiushioibor	Diploma in Community Development	2012-2017
5	Member	Amani Abrahamu	Ndedo	Certificate of Primary Education	2016-2017
6	Member	Nasinyari Meshack	Irkiushioibor	Certificate of Primary Education	2012-2017
7	Member	Alamunyak Isaya	Irkiushioibor	Certificate of Primary Education	2012-2017
8	Member	Katarina Siiyo	Makame	Certificate of Primary Education	2016-2017
9	Member	Samwel Lormoipoi	Makame	Certificate of Primary Education	2016-2017
10	Member	Sinyati Bahati	Ng'abolo	Certificate of Primary Education	2012-2017
11	Member	Mollel Samdala	Katikati	Certificate of Primary Education	2012-2017
12	Member	Siiyon Fupi	Katikati	Certificate of Primary Education	2012-2017
C.	**MWMA Secretariat:**				
1	WMA Manager				2016-2017
2	Finance & Administration	Meitiaki Ole Koiyo	Makame	Diploma in Financial Management	2012-2017
3	Anti-poaching unit and Community development	Melayeki Njurdu	Ng'abolo	Diploma in Livestock Development	2016-2017
4	Accountant	Mokia Mbaiyo	Ndedo	Bechalor in Accounts	2016-2017
5	Secretaries				2016-2017
6	Drivers				